Conservationist

State of New York Conservation Department

Showy Lady's Slippers, Rushford, N. Y., June 25, 1955

Pigs vs. people

This week — the last of May— will open the 1958 Summer vacation season. Between now and Labor Day, here in New York State, more than 30 million people will have visited and enjoyed the facilities of our beautiful State Parks; more than a million New Yorkers will have rolled into our Forest Preserve public campsites with tents and trailers; hundreds of thousands will have canoed, outboarded and cruised our magnificent inland rivers, lakes and canals — and a never-ending cavalcade of motorists will have toured the highways of New York.

Wherever these millions go during the Summer months ahead — by the clear, bright waters of mountain streams; within the dim green of forest glades; along the clean, pebbly beaches of crystal lakes; on the wind-swept granite mountain tops; along the mowed and tended parkways; on the bright, salt sands by the sea — they will leave their mark. Their mark is refuse—trash—garbage; the mark of "civilized man."

Call these people "strewballs," call them "litterbugs," call them what you will (if your conscience will permit) but recognize that here is disgrace and a sharp finger of accusation—for we are the people. And recognize, too, that it is we who pay—and dearly—for this annual onslought of slovenliness. Last year, the taxpayers' tab for gathering up litter along the State highways amounted to more than a million dollars. On Long Island (more people — more garbage) the clean-up cost was a staggering $401 per mile of State road.

But that is only part of the cost. We pay, too, in jeopardy to our rights and privileges. A case in point is the public fishing privilege extended by the City of New York along the shores and on the waters of its extensive reservoir system. Here, on the doorstep of the greatest metropolis, is fishing and recreational opportunity unique in the Country. And here, too, after a week-end of public fishing, is garbage and trash by the dump-truck load; abuse of privilege that threatens continuance of public fishing in these waters—for the City has a greater obligation to protect the health of its people.

The late George Orwell, once, in a best selling novel, cast pigs in the role of people. And why not? It's so difficult sometimes to tell one from the other.— Editor

The New York State

Conservationist

JUNE-JULY, 1958

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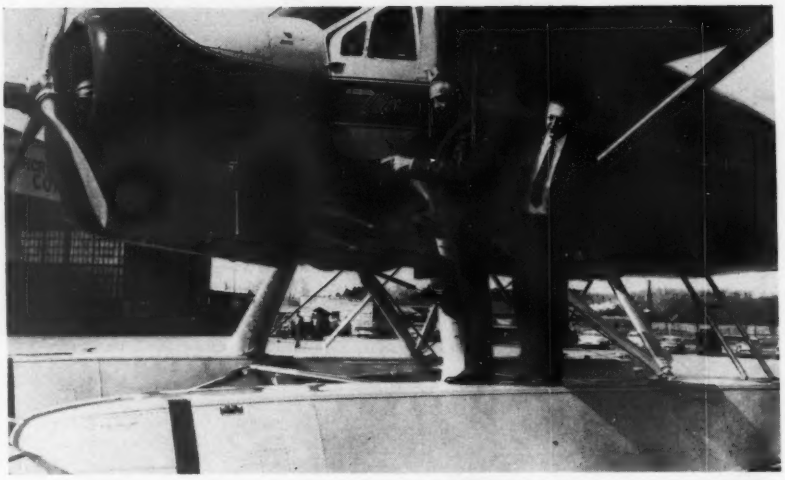
Permission is granted to reprint any text from this magazine provided credit is given to the New York State Conservation Department and to this magazine.

The Conservationist is an official publication of the N.Y.S. Conservation Dept., published every two months at the Department's offices, State Campus, Albany, N. Y. No advertising accepted. Subscription rate $2.00 per year. Entered as Second Class matter July 24, 1946 at the Post Office at Albany, N. Y. under Act of March 3, 1879. Printed in U. S. A.

Forest Fire Control In New York State

by Averell Harriman, Governor



Governor Harriman and Conservation Commissioner Mauhs inspect the "Otter"

THROUGHOUT the world the name New York brings instantly to mind the teeming population and vast industrial development of the Empire State. Ours is, to be sure, the largest in population and the mightiest in commerce and industry of any State in the Union. Yet in the hearts and minds of New Yorkers themselves the vast silent reaches of our forest lands are as much an object of our pride and concern as the tumultuous streets and harbors of our great cities. Even now almost half the vast area of our State is covered by woods and forests. Altogether there are 14,450,300 acres—practically one full acre of forest land for every man, woman and child among us.

Emergency Powers

A significant measure of our concern for the protection of our forests is that we, a free and independent people, solicitous of our liberties and vigilant in their preservation, have freely given to the Governor of the State the absolute authority in cases of extreme fire emergency to close the forests to all persons whenever he deems the public interest so requires. By proclamation, the Governor can forbid every person in the State to so much as set foot on any of fourteen and a half million acres of forests, most of which are private property.

An equally stringent provision of the law gives any officer charged with the duty of fighting a forest fire the authority to summon on the spot any male person sixteen years of age or over to help combat the fire. Any person so summoned, the law reads, "shall forthwith present himself and proceed to assist in extinguishing fires as directed."

The reason the Governor and other State officials have been granted these extraordinary powers is that the primary responsibility for forest fire control in the State lies directly with the State government. Today the forest fire protective organization of the State Conservation Department covers an area of more than 22,000,000 acres, of which over 13,000,000 acres are forest lands. Three million of these are State-owned. Another 1,500,000 acres are covered by local ordinance.

History and Administration

Like many of our basic conservation laws, State responsibility for forest fire control dates from the early part of the century. At that time fires were laying waste to our forest lands. Between 1903 and 1906, over 526,000 acres were burned in the Adirondack and Catskill areas alone. The average loss per fire was 520 acres! Nothing short of drastic action was required. In 1909 the Conservation Department — then the Forest, Fish and Game Commission — was assigned responsibility for fire prevention and control in the 7,500,000 acres of the so-called fire towns of the 16 Forest Preserve counties of the Adirondack and Catskill regions. The 1909 legislation also made provision for the erection and manning of forest fire observation towers, the employment of patrolmen (now known as forest rangers) and the employment of railroad inspectors to work at reducing the number of fires started by coal-burning locomotives, which were a major cause of the conflagrations of early days. The Governor was given authority during periods of drought to forbid by proclamation any person from entering forest lands and to suspend any hunting and fishing seasons during emergencies.

Over the years the area of Conservation Department responsibility has been expanded and is now three times that of the original acreage. The fire control organization and equipment of the Conservation Department has grown to impressive proportions.

The administration of this huge job is the responsibility of the Bureau of Forest Fire Control of the Division of Lands and Forests headed by Assistant Commissioner William M. Foss. A district forest ranger is assigned to each of the 15 district offices of the Division of Lands and Forests. These district rangers in turn supervise the activities of 112 forest rangers, 108 forest fire tower observers and approximately 4,000 fire wardens, the latter receiving compensation only when actively engaged in fire fighting. (Incidentally, anyone they "summon" to their assistance is also paid for his services.)

Personnel and Equipment

Our forest rangers are well trained, professional men whose feats have won wide admiration. I was most pleased a year and a half ago to grant them permanent civil service status which they had not enjoyed until then. The Conservation Department also employs locomotive inspectors. In addition, five airplane pilots and five department airplanes, which are used in various conservation activities such as fish-planting and waterfowl surveys, are always available for forest fire duty.

The equipment of this small army includes 135 portable power pumps, 47 miles of hose, 1,500 fire axes, 9,000 fire brooms, 11,500 fire rakes, 11,200 Indian back pack pumps, 207 two-way radios, 16 automobiles and 133 fire trucks specially equipped for forest fire duty. We now have 108 forest fire observation towers manned by trained observers and serviced by 400 miles of telephone lines.

For some time airplanes have been used to excellent advantage in spotting and patrolling fires, dropping equipment and transporting men and supplies to remote areas. The Conservation Department's newest fire fighting airplane, a DeHavilland "Otter," was delivered just a few weeks ago. This 'plane is amphibious, capable of landing and taking off from land or water, and is the largest of our five 'planes. Special water tanks mounted on the pontoons will enable the pilots to swoop low over fires in remote areas, dousing them with a 200 gallon drenching spray, then drop down on the nearest lake where the pontoon scoops refill the tanks automatically in 18 seconds while the 'plane taxies for take-off and return to the fire area. This aerial bucket-brigade can be of particular help in preventing a lightning or other fire started on a remote mountain top from getting out of hand during the time it takes ground crews to reach the scene.

In addition to the "Otter," one of the Department's Stearman spray 'planes has just been modified so it too can be used in fire fighting. A trap door type of dump valve has been fitted to the bottom of the 185 gallon insecticide tank. Flying 90 miles an hour at an altitude of 100 to 150 feet this covers a swath 60 feet wide and 300 feet long. The tank trucks which supply insecticides for the 'plane during its normal forest insect spraying operations double as a water supply system during fire fighting. The trucks can fill their tanks from streams, ponds or other natural water supplies and in turn load the 'plane's tank at the rate of 50 gallons per minute.

Forest Fires — Yesterday and Today

The combination of trained men and modern equipment has wrought wonders in the control of forest fires. Today the average forest fire burns less than 12 acres—as against 520 acres at the turn of the century. Unfortunately, the number of fires per year has trebled since then. Last year 1,757 forest fires were reported in New York State. The average for the five-year period ending in 1957 was 1,544. Ninety per cent of them were caused by carelessness—and could have been prevented.

One of the ironies of our present situation is the great willingness of the public to co-operate with a drastic order closing the forests altogether, compared with the persisting carelessness which many persons display when the forests are open. At first it was felt the public would be outraged were a Governor to exercise his full authority under the 1909 statute. It was not until 1924 that Al. Smith actually issued such a proclamation. Since then it has been necessary to do so ten times. Each time the public accepted it with greater good grace. On May 4, 1957, I was forced to close forests throughout the State for an eight-day period. The order was greeted with the utmost approbation throughout the State and almost no violations occurred. The press was notably staunch in approving the action. However, once the worst of the emergency was passed, too many persons acted as if it were gone altogether—with the inevitable result of many unnecessary fires.

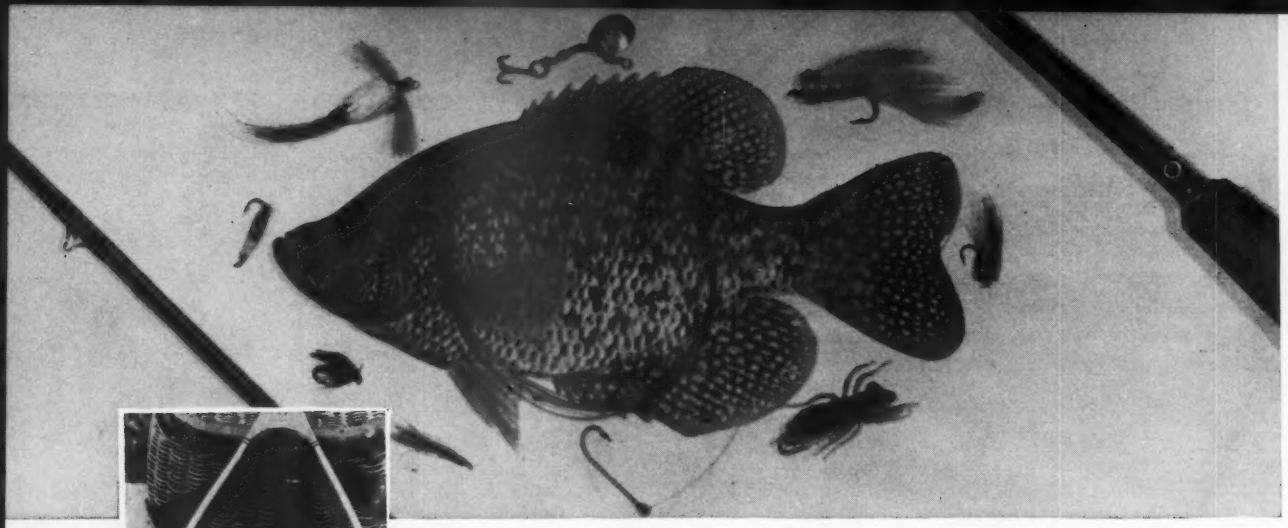
Forest Fire Control Is Your Business

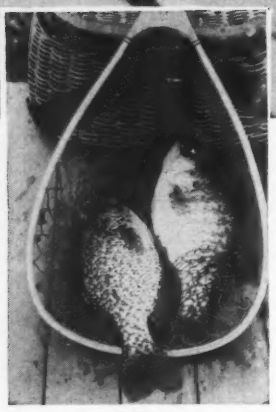
Each year more persons take advantage of the wonderful recreational facilities of the Forest Preserve and our other forest areas. It is my hope that this number continues to grow. This means however that the danger of forest fires will continue to grow with it. Superintendents Solon Hyde and Chester Yops of the Conservation Department's Bureaus of Forest Fire Control and Forest Pest Control, respectively, are doing a wonderful job in limiting the damage. But we will never eliminate it until every citizen makes forest fire control a personal cause—for the sake of a great public interest.

A 200-gallon, fire-quenching spray

Field communication by walkie-talkie

Mobile fire control unit





Crappies

by U. B. Stone, *District Fisheries Manager*

MANY widely distributed fishes have a variety of local names but in this regard the crappie, or what have you, takes all the honors. Bachelor, Campbellite, Lamplighter, Sac-a-lait, Tinmouth, Razorback, Grassbass and John Demon are but a few of 30-odd names by which this fine pan fish is known. In New York it boils down to calico bass, crappie or strawberry bass. Our choice is crappie and that's what we shall call them for the remainder of this article.

Although probably not recognized by most fishermen there are actually two distinct species involved—the black crappie, *Pomoxis nigromaculatus* and the white crappie—*Pomoxis annularis*. Thus, the beliefs held by some people that white crappies change to black crappies from Spring to Fall or that the two fish are just color phases of one species are untrue.

Crappies are members of the sunfish family. They resemble a bass somewhat but are deepbodied like a sunfish. The calico pattern or marking is distinctive. Anyone with a smattering of fish knowledge should be able to recognize a crappie. The two species are easily told apart by an examination of the dorsal fin. The black crappie has seven or eight dorsal spines while the white crappie has five or six, *(see sketch)*. Futhermore, the black crappie has a more highly arched back, a deeper body, more color in the anal fin and its general coloration is darker than that of the white crappie.

Both crappies occur east of the Rocky Mountains between southern Canada and the Gulf States although their original ranges have been extended by stocking. In New York these fish are rare or absent in several major watersheds but they are common in the western part of the State.

As to environment the black crappie prefers clear, cool waters having hard bottom and an abundance of aquatic vegetation. On the other hand, the white crappie is more tolerant to turbidity and seems to do best in warm, sluggish waters having a mud bottom. Some of the largest populations of crappies in New York occur in lakes such as Chautauqua and the bays along Lake Ontario.

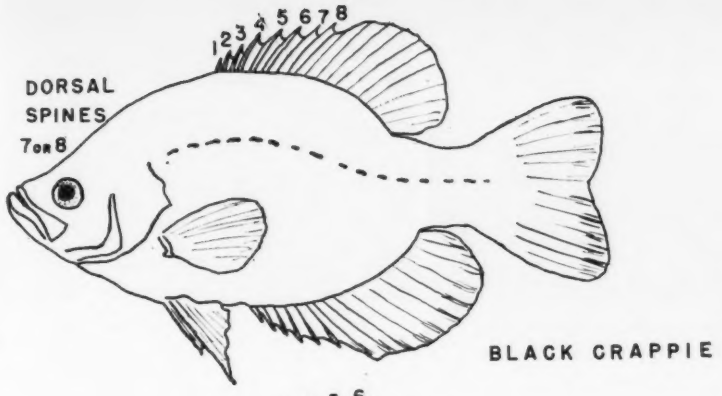
In waters where the two species occur together the white crappie may eventually dominate the population. This has been the case in Chautauqua Lake where some 20 years ago the black crappie was the predominant species but in recent years the white crappie appears to be in greater abundance.

Spawning generally takes place from the latter part of May to July. However, water temperature has an important influence on spawning time and consequently there are seasonal variations in different parts of the country. For example, in the South crappies may spawn as early as March. Spawning has been recorded at water temperatures in the range of 64 to 68 degrees F.

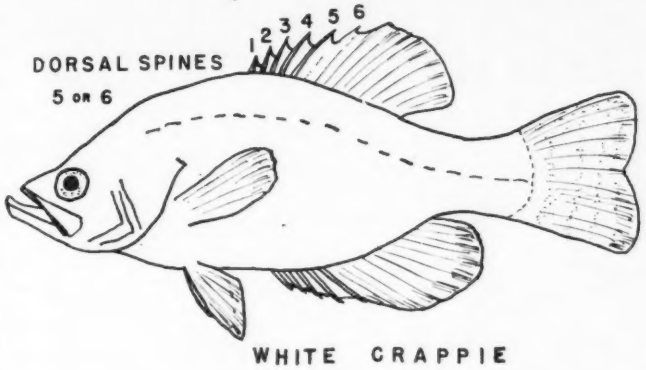
The nest is similar to a sunfish nest but is usually located in deeper water, often at a depth of five feet or more. It is roughly circular in outline and sand or gravel bottom is most often selected for the site. Frequently the nest is located near a weed bed or in the case of the white crappie in the vicinity of an old stump or brush pile. The eggs adhere to sand, gravel or aquatic roots which make up the nest bottom. They are guarded constantly by the male fish through the incubation period and after hatching until the young fry leave the area of the nest.

Crappies are carnivorous. They feed among the weed beds where they prey upon a variety of small fishes, crustaceans and aquatic insects. Young perch were found to comprise a main item in the diet of black crappies examined from Silver Lake, Wyoming County (New York) during July, 1945. Dragon fly nymphs, the variety called "spider bugs" by bait men, were another important food while one crappie had eaten largemouth bass fry.

In waters where growing conditions are favorable the crappie may commonly attain a weight of one pound or occasionally two pounds. In the southern part of its range the white crappie may reach a weight of three to four pounds. There are, however, numerous examples of



BLACK CRAPPIE



WHITE CRAPPIE

waters where crappies, because of over population or a poor environment, never get much larger than five or six inches.

The white crappie may live for at least eight Winters and the black crappie nine Winters, based upon reported age determination from the fish's scales. However, the average life span is probably much less than this.

If the habitat is suitable crappies like other pan fishes do not require further stocking once they are established in a body of water, for they are very prolific. Females may spawn from several thousand to nearly 200,000 eggs, depending upon the size of the fish.

For stocking the average farm pond the crappie is not a particularly good choice. Unless heavy predation from a game fish is maintained in small ponds containing crappies they usually become over abundant and stunted. Possibly for the deeper ponds of five acres or greater, crappies in combination with other predators such as largemouth bass may be useful in the control of bluegill populations.

It is a violation of the Conservation Law to stock fish in any water having an inlet or an outlet without a permit from the Conservation Department. The main reason for this law is to help prevent such fish as crappies from getting into waters where they are not desirable; i.e., where they would be harmful to more popular game fish. While inadvertent stocking may seem harmless to the uninformed it can actually do more to destroy good fishing than most any other practice.

In the right place the stocking of crappies has good use. For example, in the smaller lakes or ponds in city parks, provided the waters are tributary to waters where the crappie is already present, it is feasible to stock adult crappies for the children to catch. Last year a total of 25,650 adult crappies netted from Chautauqua Lake during muskalonge spawn-taking operations were stocked in 22 different waters in six western counties. Fishing rodeos for the children were held on many of these waters during the Summer. This is the principal use of the crappie in our stocking program.

While fishing for crappies is usually at its best during the Spring and Fall months, Winter fishing is often productive. Fishing is slower during the Summer and the eating quality of the fish is not as good then. Elaborate equipment is not a requirement for crappie fishing. The old cane pole may be just as effective as the most expensive outfit. Thus, good sport may be had by most anyone who can hold a pole or line, in the right place at the right time, of course. Still fishing, trolling, spinning, fly fishing and tip-ups are all effective methods for taking these pan fish. Furthermore there is no closed season on crappies and they may be taken in any number and size.

While I have heard of crappies being caught on a plug as large as the "pikie minnow" the smaller lures are to be preferred. Among the best artificial lures are small spinners, trout flies, bucktails or streamers, nymphs and poppers. Good natural baits include a wide variety: Earthworms, meal worms, most nymphs of aquatic insects, crane fly larvae (oak leaf bugs), crickets, grasshoppers, crayfish and minnows.

The Spring runs begin during April and usually last into June. During this period crappies frequent the mouths and lower reaches of the tributaries of ponds and lakes. In addition to small minnows which are excellent bait at all seasons of the year, trout flies, about size 10, take plenty of crappies during these runs. Either a black or a white fly is good. Just a piece of pipe cleaner wound around a hook is an effective lure.

Come Summer the crappie usually retreats to the deeper water and it may be necessary to fish in 20 feet of water or deeper to catch them. It may also be necessary to explore around a little to locate a school of fish but they are usually in or close to the weed beds. During the Summer evenings crappies feed along the shoals and in the weed beds. Fly rod poppers (small sizes) are effective in the weedy areas at this time and chances are you may also tie into a good largemouth bass.

Prosperous farm near Delphi Falls

Silt-filled pond near Manlius

Serious bank erosion problem

The Limestone Creek

—Another Bond Issue is Likely for New School—

—Building Projects Reported in Area—

—Villages Face Demand for Sewers—

—Recreational Facilities Subject for League—

—Planning Board Named by Village—

—Creek Needs Conservation—

—Manlius to Double its Water Supply—

—Watershed Group Advised to Plan for Years Ahead—

—Manlius Grows and Grows and Grows—

THESE nine headlines have appeared within the past ten months, on the front pages of the *Eagle-Bulletin*, a weekly Fayetteville newspaper which serves the villages and towns in the Limestone Creek Watershed. In bold face, they reveal both some of the major challenges to conservation and some of the outstanding characteristics of the area drained by Limestone Creek.

Limestone Watershed is part of the rural-urban fringe of Syracuse. Located along the eastern border of Onondaga County, it is included (except for extreme eastern and southeastern sections which extend into Madison County) in the Syracuse Metropolitan Area as defined by the United States Census, 1950. Like many other such sections adjacent to expanding cities, it has been and continues to experience the growing pains of suburban and rural non-farm growth.

Its northern section, containing the Villages of Manlius, Fayetteville and Minoa, occupies over half the Town of Manlius. In the special Census of April, 1957 the population of this town was 16,268. This represented a population growth of 6,047 or a 59 per cent increase since 1950; two thirds of which has taken place outside village limits. Approximately 4,500 more people live in the central and southern parts of the watershed which cover most of Pompey Town and smaller areas in Fabius, Cazenovia and DeRuyter (the latter two in Madison County). Even here, in this open farm country, the impact of urban expansion is evident. In 1956, for example, in the West Branch Sub-watershed in Pompey Town over half the 370 occupied dwellings belonged to rural non-farm residents. The total farm population for the whole watershed is estimated at less than 2,000. Most of this amazing growth has occurred during the last fifteen years. In the Limestone Creek Valley it has been grafted upon fine old villages and hamlets whose traditions go back more than a century. It has sprawled out into the countryside, replacing farms with subdivisions, farmsteads with modernized rural homes of urbanites. And there are no signs that the expansion will cease or even slow down!

The vital problems of conservation posed by such metamorphic conditions, with their inevitable pressures upon natural resources, call for careful study and planning—dynamic and sustained action by people throughout the entire watershed. Increasing needs for better water supplies, pollution abatement, flood reduction, outdoor recreational facilities (including hunting, fishing and woodland sites), land-use planning in agricultural as well as suburban and urban areas—all underline the necessity for understanding and co-operation among groups of diverse interests and backgrounds. For the city man and the farmer meet in the rural-urban fringe. Their strongest "community of interest" is the valley in which they live. How they manage the land and water, the forests and wildlife, the resource of space itself, will determine in large measure the social and economic prosperity of all, over the years ahead. It is to meet this challenge of natural resources management through community watershed planning, that the Limestone Watershed Association, Inc. has been organized.

What kind of watershed is the Limestone? What are its physical characteristics—its most serious problems of resource improvement and management?

The drainage basin of Limestone Creek is approximately 106 square miles. The headwaters of the main, or East Branch, of the stream lie in Madison County, in the State public hunting lands above New

After a flash flood

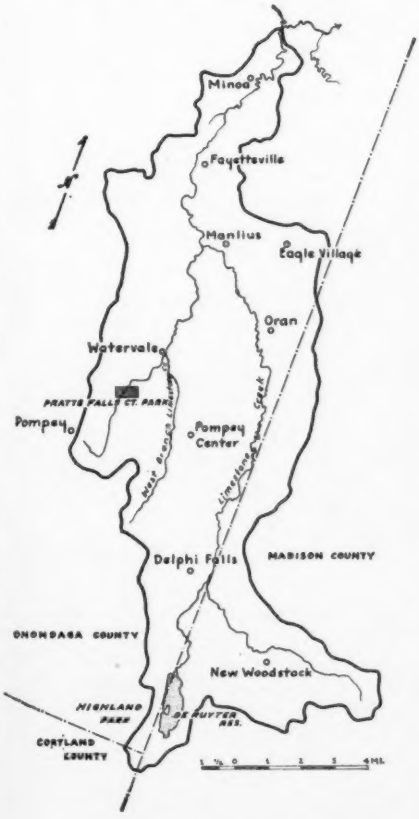
Far bank stabilized by willows

This hillside needs reforestation

Watershed

by Eleanor E. Hanlon,

Assistant Professor, Dept. of Geography, Syracuse Univ.



Woodstock. From here the flow is westward to a point just above Delphi Falls. Here the stream is augmented by flow from DeRuyter Reservoir, a one square mile storage dam built in 1863 as a feeder for the old Erie Canal. DeRuyter Reservoir actually lies astride the flattish divide between the Susquehanna and Oswego drainage basins; it is fed by a 19 square mile sub-watershed of the Middle Tioughnioga Creek, tributary of the Susquehanna River, diverted artificially to supply the Reservoir. From Delphi Falls the Limestone meanders generally northward to Oran in a flat-floored valley, known locally as Pompey Hollow. Then it veers northwest, drops 90 feet over Edwards Falls and runs on down a narrow limestone gorge to its confluence with the West Branch near Manlius.

The West Branch rises in the southern part of Pompey Town and flows north through a rough irregular valley; it drops 70 feet over Brickyard Falls before entering a gorge which opens onto the main stream just above the confluence with the East Branch. The beautiful 137-foot cascade, Pratt's Falls, lies on a tributary of the West Branch.

The divide separating the two main branches of the creek is a broad upland with gently undulating to moderate relief. Steep slopes, cut by numerous preglacial "gulfs," lead down to the valley floors.

From Manlius, Limestone Creek continues to meander northward through Fayetteville. At the Wide Waters near the old Erie Canal Feeder it emerges from the jagged edge of the plateau onto the Oneida Lake Plain, marked here by dissected remnants of old shore lines, swamps and occasional gravelly knolls. It pursues a sluggish course through Minoa to its junction with the Butternut, then bends east to join Chittenango Creek.

Limestone Creek drops from an elevation of 1,286 feet at DeRuyter Reservoir to 395 feet at Butternut junction, a stream distance of about 35 miles. Above Fayetteville the average gradient is 50 feet per mile.

There are over 90 tributaries to Limestone Creek; many flow in steep narrow channels, carrying rapids and waterfalls. Both surface and stream run-off are rapid in most of these little brooks. This partially accounts for the severity of stream bank and soil erosion in the southern half of the watershed.

There are slightly over 350 operating farms in the watershed, of which roughly 50 per cent are developing basic conservation plans, or have already done so. About 45 per cent of the land in the Limestone Watershed is cropland, including hay; about 20 per cent is in pasture and another 20 per cent in woods. The remaining 15 per cent is devoted to all other uses: Residential, industrial, commercial, recreational and idle.

Driving along the country roads in the upland south of the lake plain, one is impressed by the beauty of Limestone Creek Watershed. Numerous vantage points provide vistas across rolling hills and valleys, which in any season have a certain intimacy and appeal, reminiscent of the "hills of home."

Unfortunately the very attractiveness of much of the up-stream country blinds one to some of the problems of conservation which actually exist there. Many acres of farm and woodland are on steep slopes, or thin upland soils. For a hundred years or more, sheet and rill erosion have taken their toll. These kinds of deterioration do not generally show up in raw gullies or other dramatic ways. They are reflected, however, in scrubby pastures, neglected fields and, of course, in

lower crop yields and incomes. Soil piled up with weeds and stones against fence rows, rocks standing on end in a field, the soil washed out from underneath, are evidences which can be observed on many hillside farms. Another, rather spectacular example, is illustrated by the condition of a pond near Manlius Village. Built about 50 years ago, this pond was 8 feet deep and covered about 10 acres. Today it supports a lush growth of sedges, grasses and even an island on which forest trees are growing — in the topsoil washed down from farms up valley!

In some cases where steep-sloping or worn out land has been abandoned for as long as 25 years, nothing better than hawbush and weed trees have taken hold, unless there has been reforestation. Again, the woodlands, particularly in late Spring or early Fall, look very beautiful indeed. One does not easily see the lack of protective undergrowth, the bare compacted soil trampled by cattle not fenced out of the forest plots. Nor does one always stop to realize that this lack of care for our woodlots makes them rather barren homes for wildlife. It is little wonder, then, that Spring and storm run-off, tearing down steeply graded tributary brooks and their precipitous interfluves, frequently brings flash floods and tragic destruction of topsoil on the valley floors.

There are water supply problems too, in Limestone Watershed. With the exception of the Village of Minoa, water is obtained from natural springs or wells. Many of these, especially in the northern, more populated half of the area, originate in limestone or tap perched water tables in glacial till. They are subject to periods of low flow and their waters tend to be hard. With increasing population pressure, there is real concern as to how many more people can be supported by these presently developed, ground water sources. Feasible solutions are available, but they are also very costly. The whole matter of water supply is a challenge to our need to know in much more detail than we do, the basic facts of our ground water resources, and the physical characteristics of our streams and brooks.

Pollution from raw and treated sewage and industrial wastes, stream bank erosion and siltation have made Limestone Creek, once a famous trout stream, a really serious liability rather than the beautiful asset it should be. It has become so clogged with mud and sediment, and snagged by fallen trees that floods have become a menace, not only to homes and industries in Manlius, Fayetteville and Minoa but also to farms in the upstream area. In short, the natural resource base, the very foundation, of Limestone Creek Watershed has been allowed to deteriorate over the years; it is badly in need of repair.

How does a group of ordinary citizens organize a watershed association? How does it tackle problems such as these described above, in a rural-urban fringe area, dynamic and complex? Those of you familiar with the excellent articles about other watershed groups featured in this magazine during recent years, know that every watershed is unique, every association different. Limestone is no exception. There are, however, a considerable number of watersheds, which, like this one, occupy the immediate hinterland of large cities. Since their problems have similarities to those of Limestone, it may be helpful to describe the way we are going at the solutions in Limestone Watershed, even though our Association is still too young to have any spectacular achievements to show.

The Limestone Watershed Association, incorporated under the laws of New York State, April, 1957, is a non-profit, non-partisan, dues-paying organization, supported entirely by voluntary membership. It draws its members from all people, clubs, civic groups, etc. in the Limestone Creek Watershed.

For two years prior to formation of the association, a small group of citizens, the Limestone Creek Watershed Council, encouraged and supported by the Natural Resources Council of Onondaga County, studied the watershed. In addition, this group assembled literature from other areas; e. g., the Brandywine Valley Association, the Pennsylvania Federation of Watershed Associations, the Stony Brook-Millstones Watersheds Association, N. J. and the Ohio Forestry Association. Discussions were held with men from these and other places in which watersheds were being developed.

There were two guiding principles during this exploratory period: First: Before we could improve the Limestone Watershed we must know its geography and its resource conditions in some detail. A systematic collection of facts about the present land use, ownership, land management practices, soils, terrain, forests and wildlife; water supply and waste disposal, population, settlement, roads, farm and village economy must precede any reasonable attack upon or solution of conservation problems. Second: We must know the what and where of conservation work which has been, or is being done in our watershed, by clubs, civic organizations and by local, State and Federal government agencies. We must co-ordinate our effort with theirs, not compete with them. Where possible and desirable we must try to bring them together so that the best possible solutions may be found.

Both principles continue to be followed. Much of the information sought is still not on our maps nor in our notes. We expect, however, to publish the geography of the watershed, with maps, pictures and interpretive analysis within the next two years. This booklet will be for the people, available at nominal cost.

In February, 1957, the Limestone Watershed Association was created, officially, at a special public meeting. By means of letters, 'phone calls and personal contacts, the organizing group made certain that all sections of the valley and all major interests were represented at this meeting.

Since then we have operated through citizen committees, directed by a central Steering Committee from which officers are chosen. Its twenty-two members include: Two manufacturers, an engineer-part-time beef farmer, an insurance salesman, farmers, professors, housewives, a spectroscopist, an electrical contractor and tree farmer, high school and college students, a lawyer, machinist inspector, real estate dealer, a poultryman and a retired business executive. The areal representation of the Steering Committee is equally diverse. All participants are voluntary and give freely of their time, talents and ideas.

There are now six working committees, whose responsibility it is to collect facts, study and report conditions pertaining to: (1) Water supply; (2) recreational needs and potentials; (3) agriculture and forestry; (4) fish and wildlife; (5) flood damages; (6) geographic survey. All these are conceived as long-range programs, but whenever an urgent situation arises the Steering Group becomes a Committee-of-the-Whole to concentrate on that problem. Currently we are focusing on pollution abatement, working closely with municipal and town officials, planning boards, industries and the State Water Pollution Control Board. All tasks connected with these and related problems take time. Much patience and perseverance are required if progress is to be made.

In the meantime, there is the ever present and pressing need for educational, promotional and other kinds of public relations endeavor. Small, but significant projects which give many people an opportunity to participate directly in improving the watershed must be carried on. We have placed high priority on these aspects of our challenge and potential contribution. Under the direction of a Public Relations Committee, everyone on the Steering Group is involved in these activities. They include such things as: Work on membership campaign, preparation of press releases, sponsoring and conducting tours, supervision and plan-

(*Continued on page* 33)

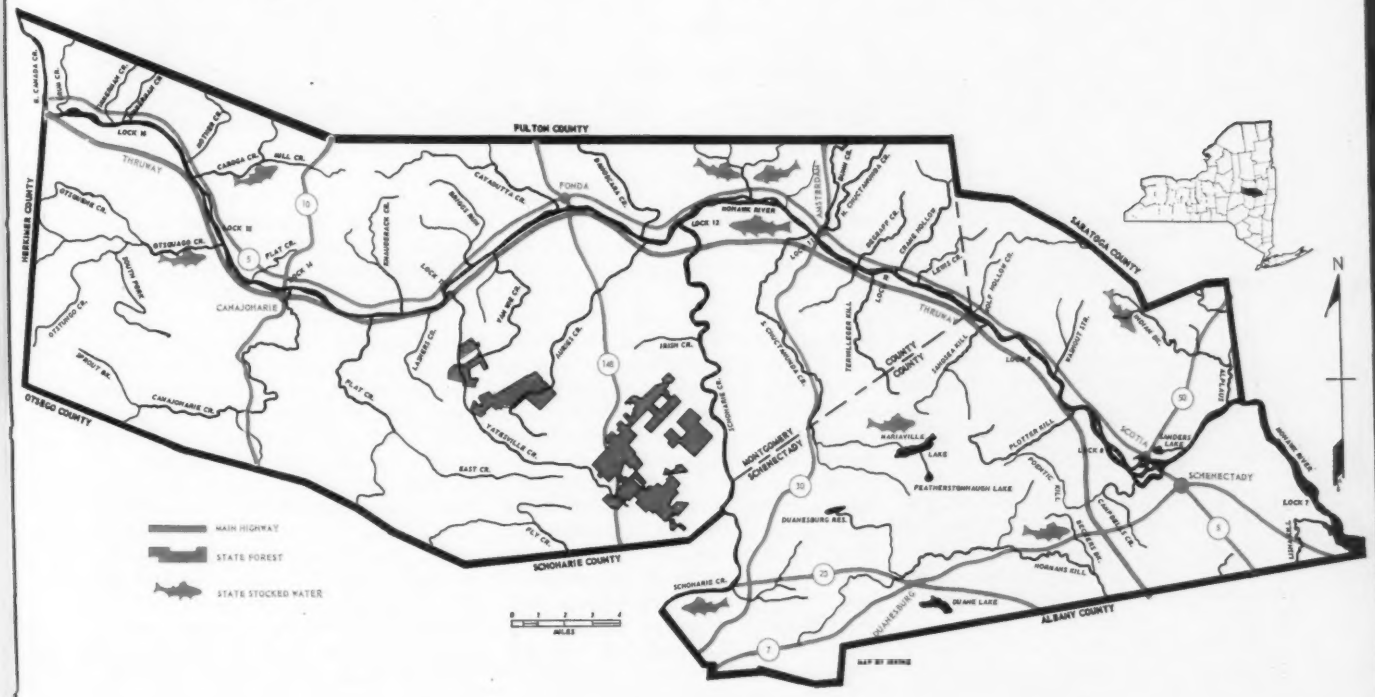
Conservation Department Offices

District Forester	270 N. Main St., Herkimer
District Game Manager	Wildlife Research Lab., Delmar
District Fisheries Manager	21 Lackawanna Ave., Norwich
District Game Protector	408 Rogers Bldg., Glens Falls

Farm Service Offices

Soil Conservation District	Old Court House, Fonda
Agricultural Agent	Old Court House, Fonda

Montgomery County



Schenectady County

Conservation Department Offices

District Forester	Catskill Nat. Bank Bldg., Catskill
District Game Manager	Wildlife Research Lab., Delmar
District Fisheries Manager	21 Lackawanna Ave., Norwich
District Game Protector	Broadway Arcade Bldg., Albany

Farm Service Offices

Soil Conservation District	Court House, Schenectady
Agricultural Agent	Court House, Schenectady

—Roy Irving

Want More Rabbits? Part 2

by Joseph Dell, *Game Research Investigator*

Nesting success depends on camouflage and location. There's a nest here (left) — uncovered (right) showing hair liner and young

This is the second of two articles prepared for use by beagle and gun clubs and others interested in cottontail rabbit management. The first article (December-January, 1957-58) described food and cover management projects designed to improve cottontail habitat for the long Winter months. Here, the author rounds out the year, with emphasis on Summer food and cover improvement practices.—Editor

ALL rabbit hunters old enough to have salted away some memories (frequently enriched and embellished by the passage of time) dearly recall that brushy lot down on what used to be the old "Blackwell" farm where "I always got my limit about 15 years ago." After this straight jab, comes the inevitable right cross. "I was back there last season and the cover is as good as ever but the rabbits are scarce —you've got to stock more rabbits to build up the population!"

To those of us whose job it is to meet the public and exchange views on game problems this subject undoubtedly is one of the most common topics of discussion; and by no means is the game in question limited to rabbits. (The primary subject discussed here is cottontails, but the underlying principles apply equally well to other species.)

We cannot argue with the probabilities that rabbits were abundant enough on the "Blackwell" farm at one time to seem almost limitless; or that a decade or two later they were quite scarce even though the cover still *looked* good. But in the idea that the cover is still the same and that stocking will make up the difference in abundance we get to the heart of the question and must take exception to the conclusions drawn. Stocking as a means of increasing rabbit abundance has received very thorough trials in New York and many other states. These tests have only served to strengthen the main theme of this article—that the habitat dictates the amount of game which can be maintained on an area. True, temporary abundance increases can be accomplished with stocking, but as deficiencies in the needs of the species crop up (the reason why native rabbits are no longer abundant there) these artificial surpluses in numbers quickly dwindle away. Habitat holds the key to abundance whether it be fish or insects; reptiles or game animals.

But let's get back to the old "Blackwell" farm. There, year by year, some very subtle habitat changes have been taking place. Nature never stands still and plant species vie with one another for their place in the sun. The weaker die out and the more vigorous dominate in the gradual but constant struggle toward the climax type—the mature forest in this part of the country. Grasses give way to courser weeds, the latter succumb to brush species and they in turn to the short-lived trees. More time passes; these are succeeded by the more durable timber species and the landscape becomes dominated by a solid canopy of trees.

This is the situation—a climax forest—which confronted the early settlers who founded New York State. At that time the cottontail rabbit, a farm game species, was not a part of the animal community found resident in the State (with the possible exception of parts of Long Island). Instead, the varying hare, a forest species, occurred common to abundant. Then, as the forest frontiers gave way to cultivation, the native varying hare was forced to retreat and the cottontails literally rode in on the plows. In recent years a reversal of this trend has occurred as a result of abandonment of thousands of acres of hilltop farms and reversion to woodlands, speeded considerably by reforestation practices. The success of the Department's varying hare trap and transfer program, necessary because no natives hares were near enough to move in naturally, is convincing evidence of the importance of the basic habitat in determining which species will thrive.

Gradual changes of any sort often go unnoticed and cover succession stages are no exception. One must return to an area after years of absence to see habitat changes that go unnoticed from season to season. The long dormant seasons may add to the illusion by giving one an opportunity to become accustomed to the relatively minor changes of one year before the next growing season again makes

additional revisions. These changes not only are quantitative but also are qualitative. Rabbits have requirements; they have tolerances; and they have definite preferences. Each plant species in the environment fits into a different pattern, not only by its very existence but also by such factors as its height, abundance and relationship to other species. Thus, what superficially may look like good rabbit cover to humans, may look entirely different from the rabbit's point of view.

Food, Shelter Necessary

In order to survive, rabbits must have food and they must be able to evade their numerous enemies by use of the available cover for shelter, for hiding themselves and their young and for rapid escape. They succeed best when there is a good blend of high quality grasslands, brush and very young trees. This combination, thoroughly scrambled into small units, makes up the food and cover potentialities which meets best their year around needs.

Under conditions associated with clean farming practices, rabbits are apt to have available to them a super-abundance of high quality Summer foods, average to good Summer cover conditions, but very definitely limiting amounts of Winter food and cover. Where topography, land quality or other factors limit cultivation to a smaller percentage of the total farm's acres, the "waste" land adjoining crop lands often supplies the Winter food and cover requirements lacking on the "clean" farm. Here, more rabbits can be expected. If lands which have been wholly or partly cultivated are abandoned, natural cover succession goes to work and invasion of former crop lands by shrub and tree species begins. When this succession reaches the stage where all or most rabbit needs are available in greatest quantities, and in good balance, peak rabbit abundance results. This was the "Blackwell" farm of 15 years ago. But just as a condition of having more than enough of the Summer and too little of the Winter needs available can limit abundance, so too can the lack of Summer food and cover become the limiting factor for cottontails regardless of a super-abundance of excellent Winter cover. This is the "Blackwell" farm of today which isn't producing the rabbits it did formerly.

In short, animal abundance is a direct product of its environment and whereas habitat improvement is a sweatier, much lengthier and less glamorous operation than stocking, it holds the real key to more game. And in this age of shortages of land open to public hunting, of better guns and ammunition, of better transportation, and of much greater competition for the game available to hunters, the obvious recourse is to make the land still available for this purpose produce more game per acre. This article and the one which appeared in THE CONSERVATIONIST for December-January, 1957-58 dealing with Winter habitat, were designed for use by clubs and individuals to achieve that aim. For studies of the rabbit and its environment have provided the tip-off to at least some of the environmental conditions which have existed at various times and places to support high populations. And humans, blessed with the ability to think, learn, plan and profit from past experiences, are able to accelerate, reverse or control the natural succession of cover to suit their purposes.

Summer Cover Requirements

During the Summer months, cottontails have the same types of animal enemies to steer clear of as in the Winter; though the hazard is lessened to some extent by the tremendous increase in natural cover. At the same time, however, these enemies are bringing off families and their demand for prey is increased. Also, new enemies and factors which increase rabbit vulnerability enter the picture. Courtship activities act to depress the natural wariness of the species (witness the sudden increase in highway kills as the mating season begins). Females are more exposed to danger while at the nest, nursing and ministering to their young. This occurs each dawn and again at dusk for about a two-week period during each of their five litters. Her presence there also is apt to call attention to the nest which might not otherwise be found. Ticks, mosquitoes and other insects harass them day and night causing them to seek relief either by dusting in loose earth or by selection of resting sites exposed to breezes—and to predators. Added to the hazards are fire, flooding and farm cultivation practices—all distinct threats to nestlings and very young rabbits throughout the Summer season.

Thus, the complete Summer enviroment must offer protection from many if not all of the above mentioned hazards. Conditions which favor cottontails in their struggle for survival during the Summer are not as clear cut as for Winter needs.

In the main, however, practices recommended for Winter habitat management will serve also to improve Summer cover conditions for rabbits since the objective in both seasons is to reduce high cover canopies (as provided by trees) to medium and low ground cover afforded by grasses, herbs, shrubs and tree-base sprout growth.

A major loss in the potential rabbit population is suffered while in the nestling stage. Studies have shown that about 35 per cent of all rabbits born do not survive even long enough to leave the nest (normally about 14-16 days). These losses can be traced to numerous causes, chief among them, farming practices, drowning, suffocation and predation. The latter include, in addition to the normal winged or four-footed predators, flesh flies, ants and shrews.

Recommendations on ways to cut down on nesting losses are difficult to make. Most nest observations are the result of accidental discovery, usually following their disturbance or destruction. Active nests are masterpieces of camouflage and are extremely difficult to locate, (*see photos*). In all probability, most nests found are those least cleverly concealed or tended and do not represent the aver-

Clearing saplings for a food plot

Seeding to rye grass

Mature crop provides food and shelter

age. However, certain tentative conclusions may be reached: It is quite certain that the first litters are reared in close association with Winter cover since, when born (mid-April), grass growth usually is neither tall nor dense enough to hide nests effectively. Properly managed Winter cover maintains a high percentage of growth close to the ground. This situation also provides a greater variety of well-hidden nesting sites and probably would increase the odds for success. Also, as mentioned above, drowning is a common cause of nestling losses. Although the nest liner of belly hair and dried grasses in which the mother deposits the nestlings is usually adequate to ward off normal chill and rain, occasional heavy downpours or prolonged rainy periods may create flood conditions. Since rabbit nests are constructed by first scooping out a depression in the ground, they are water traps, often bringing about drowning or death by chilling. Thus, if there is a choice in selecting locations for establishing or improving Winter cover, low spots should be avoided in preference to elevated or hillside sites to safeguard against first litter losses during early Spring.

Basic soil fertility and pH play an important role in presence or lack of Summer cover. Field soils low in nutrients or very acid usually support a very poor, low growth of vegetation and offer little in the way of cover or food. Frequently, such fields may be covered with a solid mantle of moss. Cultivation usually is required, in addition to applications of lime and fertilizer to return such soils to a point where rabbits derive some benefits.

Food Plots

Rabbits require green herbaceous foods from April through October. Whereas, at one time or another they will eat a large majority of all the species found in their environment, only a relatively few rate high on their list of preferences and are taken regularly and in quantity. This selectivity can be seen easily in the early morning or late evening hours. Find and focus your binoculars on a feeding rabbit in a field containing a preferred food such as dandelion which is easily recognizable while in bloom or fully seeded. You are sure to see your rabbit hop from plant to plant nipping off and chewing down with obvious relish the leaves, flowers and fruit stems and ignoring the other less palatable plant species present.

Ways in which to maintain, improve or establish good food plots are as varied as there are areas to improve. The least dramatic in terms of immediate changes in rabbit abundance is, nevertheless, probably the cheapest and most effective over the long haul—that of maintaining good feeding areas which already are in existence and are located favorably. Where such plots are threatened by invasion of larger and courser weeds, shrub or tree growth, occasional mowing and top applications of lime and fertilizer will prolong their effective life by invigoration and by suppression of the competition. Clovers are especially benefited by the mowing and lime treatment.

Mowing encourages succulent growth

On areas managed for rabbits, mowing in large fields should be confined to strips 10-20 feet in width and 20-40 feet apart. This pattern will assure alternate areas of cover bordered by feeding areas. The mowed strips should adjoin woods or brush field borders, hedgerows or other islands of cover which occur in the fields.

If good Summer foods are in short supply where needed, more drastic cultivation methods are required to break the unproductive sod and prepare a seed bed for planting. As indicated above the ultimate aim in improving rabbit habitat is a scattering of small food and cover plots rather than fewer large plots. Food plots should border closely on good escape cover, preferably on two or more sides. They need not be more than 20 feet wide if next to cover on one side, double that width if bordered on opposite sides.

Where rabbits are scarce because of a shortage of Summer foods (a condition more prevalent than is generally recognized), a land clearing operation to establish herbaceous foods affords the best management opportunity for a sizeable increase in local rabbit abundance. (*see photo*). Except under extreme conditions, however, this approach is not generally recommended. Costs of this type of operation are high and maintenance is a problem. Unless habitat management practices are continuous the achievements are short-lived. Special interest groups such as beagle clubs would be most apt to keep up the maintenance for such an operation and profit accordingly.

Recommendations of food species to establish for rabbit welfare are based on studies conducted in areas supporting good rabbit populations. Also test plots of several plant species, singly and in combination, have been created to record utilization, survival potential (in years), growth habits, and other characteristics. On the basis of these observations certain recommendations can be made with assurance: Of the perennial cultivated plants, Kentucky blue grass and ladino clover appear to have excellent all around qualifications and work out well also in combination. Alfalfa, red clover, timothy, alsike clover, wild white clover, orchard grass and red top also are attractive to rabbits and are relatively long-lived species. Domestic rye grass and Winter wheat, although annuals, merit mention because of their attractiveness for rabbits and the fact that they provide a source of green food later in the Fall and earlier in the Spring than most other species. Both serve well, too, as nurse crops for the establishment of perennials. Since the annuals generally sprout earlier and grow faster than the perennials, in addition to functioning as a nurse crop, they provide a quicker source of preferred food where there might be a major deficiency. Buckwheat, soy beans, vetch and millet are other annuals which get a high degree of use.

Many of the "weed" species also are avidly taken by rabbits. Dandelion, plantain, wild carrot and quackgrass receive heavy use. To a lesser extent but still quite heavily utilized are "butter and eggs," aster, goldenrod, sheep sorrel and cinquefoil. *The possible presence of these or other plant species which are being taken by rabbits in large amounts should be established before jumping headlong into an expensive operation of establishing food species.* A close look at the plants and ground around them will quickly establish their use.

In conclusion, the supreme importance of relating food to cover and *vice versa* in managing the environment for cottontail rabbits has been mentioned or implied several times in this and the preceding article dealing with Winter habitat. This point cannot be stressed too often. Rabbits are a low mobility species and usually live out their entire lives within a very few acres. High populations can exist only where the year around food *and* cover needs are met in adequate quantities and quality. Whereas this article deals mainly with Summer considerations and the previous one with Winter's problems, the two cannot be separated in the management plan. To stress one at the expense of the other is like pouring water in a barrel with a hole in it; any level reached above the hole is strictly temporary, even if "stocked" frequently with additional water.

Splake
in New York

by Charles R. Deuel,
Fish Hatchery Foreman

Typical home for splake

A beautiful catch

DO you want to catch a splake? You can—and this year, too, as a consequence of the development and rearing of this hybrid at the Conservation Department's Adirondack Hatchery, and the subsequent stocking of this species in suitable waters of the State. As the name infers this fish is a cross between the speckled or brook trout—hence the "sp" from speckled—and the lake trout—hence the "lake"—so we get the name "splake."

The splake program in New York was initiated with the take of just a few eggs in the Fall of 1953, so it has been in progress just over four years. However, this was not the beginning of the story for this trout hybrid. The cross of lake trout and brook trout was made many, many years ago. The Annual Report for 1878 (80 years ago) mentions this hybrid being developed at the Caledonia Hatchery and by 1881 the hatchery was maintaining a small brood stock of splake. As mentioned, splake eggs were taken at the Adirondack Hatchery in the Fall of 1953. The lake trout eggs used were from wild breeders netted in Upper Saranac Lake and fertilized with hatchery brook trout males, either yearlings or two-year-olds.

The loss in the hatchery on splake eggs is seldom much if any greater than that on our lake trout eggs. Splake feed and grow like brook trout—therefore faster than lake trout in a hatchery—and the mortality rate is consistently low. But they do differ from other trout in two characteristics. They are very scary and fast-moving in a trough or raceway and at a size of about two inches they start jumping from the troughs or even from the raceways where the top of the wall is twelve inches above the water line. Therefore, at least the upper end of our troughs and races have to be kept covered.

As far as appearance goes the splake looks exactly what it is—a cross between the brook and lake trout. It maintains the square tail of the brook trout but the red speckles are less pronounced; the vermiculations on the back more closely resemble those of the lake trout. In the young stages the body is slimmer than that of a brook trout but stockier than that of the lake trout.

In 1953 only about 2,500 splake eggs were taken. The resulting fingerlings were stocked in the Fall of 1954, in Panther Pond. Since that time we have increased the take to approximately 20,000 eggs per year. This is sufficient for the present requirements and permits the holding of a few hundred of each year class for future breeders.

Two Adirondack ponds were originally selected for splake planting—Panther and Connery. In addition, occasional plantings of a small surplus have been made in a few borderline trout ponds in our area. Also two ponds in the Southern Tier—Oquaga Lake in Broome County and Hatch Lake in Madison County—received an initial plant of 3,000 fingerlings each in the Fall of 1957.

Panther Pond is a 9-acre brook trout type pond of 20 feet maximum depth, located along the Saranac Lake-Tupper Lake highway. It was reclaimed, by the use of rotenone, in 1954. The original planting of 1,590 5-inch splake was made in October, 1954. It was test-netted in August of 1955 with the capture of 13 specimens averaging about 7¼ inches in length, and averaging a little over two ounces each in weight. No more netting was done but angler checks indicate the maximum size now to be from 12 to 14 inches with one, 16-inch fish being reported. Annual plantings of 1,000 Fall fingerlings are made in Panther and are affording good fishing for this fairly small run of splake. One interesting observation is that in December of 1957 when the ice had gone out anglers were having success in this pond (see "New Laws for 1958" for amendment re splake).

Connery Pond is a 70-acre pond of the lake trout type having a maximum depth of about 50 feet. It is located near Lake Placid. It was reclaimed in 1955 and Fall splake fingerlings, 4¾", were stocked October 28, 1955, with a second stocking on September 7, 1956 at 3½ inches. The pond was netted on November 1, 1957 and 52 specimens of the 1956 planting were recovered; these averaged 11.6 inches. A growth of from 3½ inches to 11.6 inches in a year and two months is certainly very satisfactory.

The experimental plant of 1,200 splake yearlings at 7¼ inches on May 16th produced fish averaging 10½ inches weighing nearly one-half pound each by that Fall. By the following Fall they averaged over 14 inches and over one pound each.

One other Adirondack pond should be mentioned because we hope to get some interesting data there in the next few years. This is Green Pond, a 50-acre lake trout type pond, located near Saranac Inn. This pond was reclaimed late in 1956 and did not clear up until the Spring of 1957. Last April it received the initial plant of splake—2,000 yearlings at 6 inches plus rainbow yearlings. Also to determine whether a supply of forage fish would increase growth it was planted with adult alewives. A report from an angler mentioned small alewives present in the stomach contents of two splake captured last Fall.

Splake normally mature at three years of age. Nineteen fifty-seven was the first year in which we had mature breeders. These were from the eggs taken in 1954. So this year we made all of the five backcrosses, taking a comparatively small number of each just for experimental purposes. For example, splake eggs fertilized with a male brook trout should produce a fish that is three-quarter brook trout and one-quarter lake trout.

Splake are reported to be very sporty on the rod and also very palatable. It is hoped that they will prove to be a longer-lived and possibly larger fish than our native brook trout. They certainly are already affording at least a "change of pace" for our New York State anglers.

Results of netting checks and other information was furnished by Robert G. Zilliox, District Fisheries Manager. The information on early splake culture in New York was compiled by James J. Lindsey, District Supervisor.

Motor Boat Legislation

A Progress Report

by Assemblyman Charles A. Cusick,
Chairman, Joint Legislative Committee on Motor Boats

THE boom in boats continues unabated. More and more people are turning to our lakes and streams for their outdoor recreation and in 1958 thousands of new enthusiasts will discover the unlimited pleasure and undeniable benefits of boating (see "Boats and Boating," THE CONSERVATIONIST, April-May, 1958).

Each passing year sees an increase in the number of boats and motors in use and the impact of boating is being felt not only in the field of sport but also in the economic and business world. It can truly be said that boating has in every aspect become big business.

The Joint Legislative Committee on Motor Boats is endeavoring to make boating a safe, sane and completely enjoyable sport. We in New York are blessed with a great abundance of recreational waters which should be enjoyed by all to the fullest extent possible. Unfortunately, there are always the heedless few who will not respect the rights of others, who abuse privileges and who cause needless accidents and injuries. Because of them it has become necessary to consider the adoption of equitable and more modern navigation controls. Since its inception it has been the aim of our Committee to recommend for enactment a series of practical laws and regulations which we believe will adequately control the use of our waters and insure that *all* may use them, happily and safely, without unreasonable restrictions or unnecessary interference.

At the 1958 session of the Legislature thirteen bills were introduced under the sponsorship of our Committee. One of the most important bills enacted requires that all motor boats operated on all waters within the boundaries of the State be registered with the Department of Public Works and only boats already registered with the Coast Guard and those which are within the State for less than ten days are excepted. Heretofore our registration statute applied only to boats operating on the inland waters of upstate New York. The new law which takes effect January 1, 1959 will cover thousands of smaller motor boats operating in New York Harbor, the lower Hudson River, Long Island Sound and in waters of the Atlantic Ocean lying within the jurisdiction of New York State. Thus, the Department will have a more complete roster of motor boats operating within the State and a more comprehensive system of identification for purposes of law enforcement.

Another bill enacted this year places an important new safety measure on our statute books. Under its terms any person operating a pleasure vessel on the navigable waters of the State which is involved in an accident causing death, personal injury or damage to property in excess of $25 is required to make a written report of the accident within seven days to the Superintendent of Public Works. Previously, an operator involved in an accident was required to report it only to the person injured or damaged and no public record of the accident was made. These reports will reveal trouble spots and areas needing additional enforcement activity and will be of great value, not only to the Department of Public Works, but to this Committee in its further studies.

In the past there has been some question concerning the courts before which Navigation Law violations should be prosecuted. As has been pointed out to the Committee, the exact location of municipal boundaries extending over water is often uncertain and it has been difficult to be sure that the right tribunal was exercising jurisdiction. Under an amendment approved in 1958, concurrent jurisdiction of violations is now given to any court in any municipality in the county (outside the City of New York) which borders upon or contains a river, lake or canal where the violation occurred. This new statute should greatly assist law enforcement agencies in disposing of alleged violations.

We were able also to amend the sections of the law having to do with lights to be displayed on vessels. The old law has been repealed and we now have a new statute which follows the Federal regulations. This should prove convenient to the boatman by removing uncertainty and making it unnecessary to change lights while passing from one water to another. It has been the aim of this Committee, when possible, to follow the Federal rules for statutory uniformity.

Another amendment adopted provides for dealer's registration certificates and distinctive numbers. This should serve the convenience of boat manufacturers and dealers and simplify the procedure to be followed in registering boats owned for demonstration and sale purposes.

An archaic statute which required that a copy of the Navigation Law be carried on board every vessel has been repealed. Since this law was impractical and seldom observed the Committee recommended its elimination.

Two bills containing the boating safety and educational program recommended by the Committee were not favorably acted upon. The first authorized the Superintendent of Public Works to establish and administer a program designed for the training of youthful boat operators, including the awarding of Boating Safety Certificates. This plan is similar to the one used by the Conservation Department in qualifying applicant minors for hunting licenses. This measure passed the Assembly but was not approved by the Senate Finance Committee. The second bill established an age limitation for boat operators who had not completed an approved safety course. This bill passed the Senate and Assembly, but was vetoed by the Governor. With necessary modifications, these bills will be reintroduced at the next session of the Legislature.

In order to encourage the establishment of local Navigation Law enforcement units, the Committee introduced a bill providing for the partial reimbursement by the State of funds spent by municipalities in carrying out enforcement programs. This bill was passed by both houses but was vetoed by the Governor. The Committee is convinced that boating law enforcement functions can best be carried out on the local level by officers who are familiar with conditions in their areas and with the identity of persistent violators. Several sheriffs' offices are already operating efficient enforcement programs and there is no reason why others cannot do so, if the State pays a fair share of the cost of their operation. Since the State receives all moneys from registration fees it seems entirely reasonable that a portion of this revenue should be channeled back to the municipalities to support law enforcement activities.

The Committee acknowledges the invaluable assistance it has received from many organizations interested in boating safety including the United States Coast Guard Auxiliary, United States Power Squadrons and the American Power Boat Association. Their representatives were especially helpful in developing our educational program and have offered the services of their groups in administering the training programs which will be necessary following the adoption of the plan. Their assistance in this field will substantially reduce the State's cost of operations and insure that the training is given in an efficient and effective manner.

Lake Skannatati

Location

Palisades Interstate Park, Orange County

General

Constructed in 1947 on site of a beaver dam

Physical Features

Area: 38.3 acres
Elevation: 891 feet
Maximum Depth: 26.5 feet
Bottom: Mud

Chemical Characteristics

Oxygen: Poor below 18 feet
pH: Acid
Transparency: Clear

Fish Present

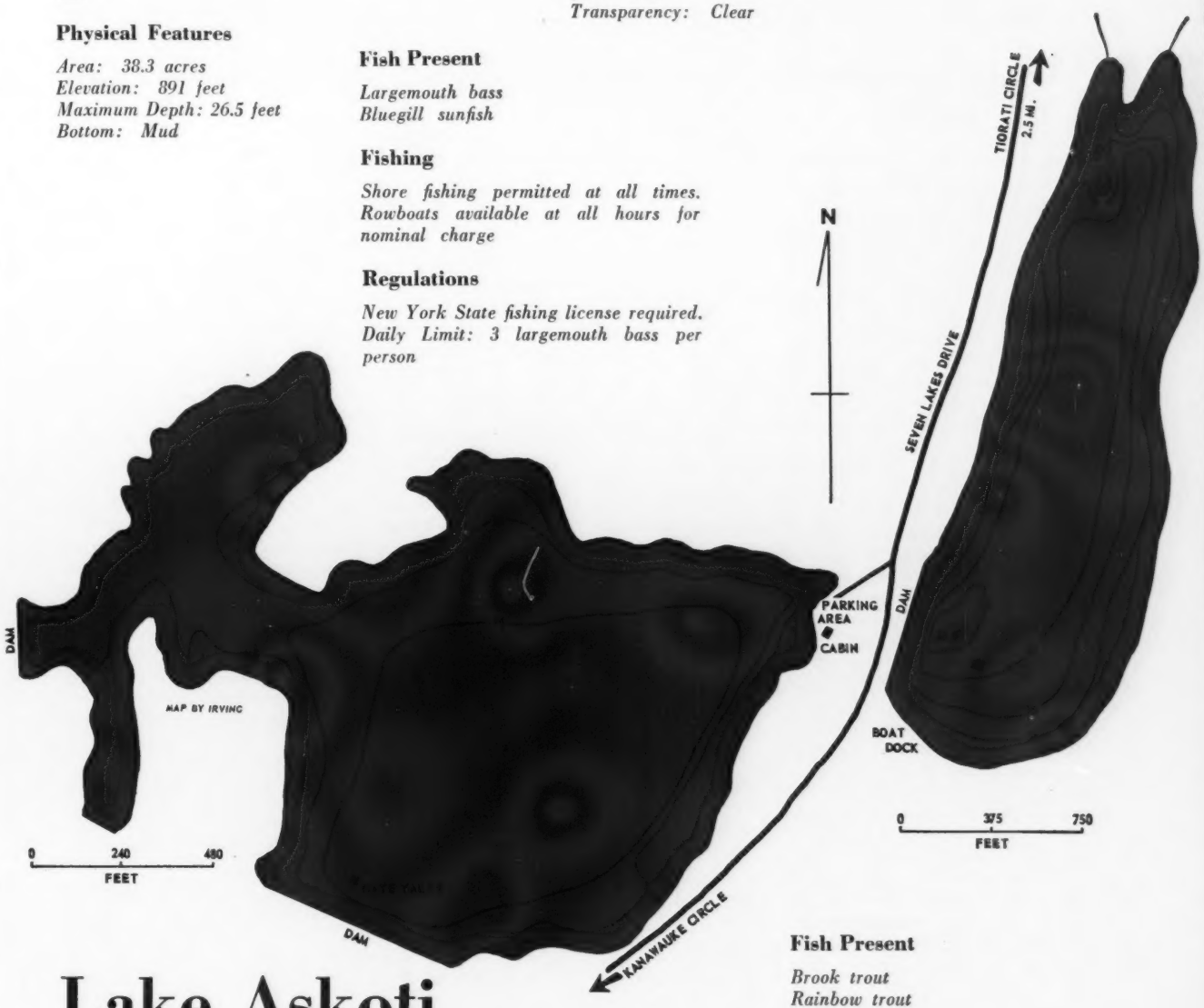
Largemouth bass
Bluegill sunfish

Fishing

Shore fishing permitted at all times. Rowboats available at all hours for nominal charge

Regulations

New York State fishing license required. Daily Limit: 3 largemouth bass per person



Lake Askoti

Location

Palisades Interstate Park, Orange County

General

Originally a beaver dam, later enlarged by an artificial dam. Formerly contained warm-water species. Reclaimed for trout by poisoning with rotenone. Askoti is one of four park lakes reserved exclusively for fishing

Chemical Characteristics

Oxygen: Poor below 18 feet
pH: 6.0, acid
Transparency: Clear

Physical Features

Area: 41 acres
Elevation: 914 feet
Maximum Depth: 21 feet
Bottom: Mud, sand, gravel and detritus

Fish Present

Brook trout
Rainbow trout

Fishing

Shore fishing permitted at all times. Rowboats available at all hours for nominal charge

Regulations

New York State fishing license required.
Daily Limit: 3 trout per person
Lures: No bait fish permitted

—Cecil E. Heacox,
District Fisheries Manager

Cayuga Lake Trout Diary

by Dwight A. Webster, *Professor, Fishery Biology, Cornell University*

Fishermen on This Central New York Trout Lake Make a Valuable Contribution to Cornell's Research Program

This is the first in a series of three articles concerning the lake trout of Cayuga Lake. The second installment will review life history of the species, food habits and movement; the third will discuss population trends, mortality rate and something more on fishing for lake trout. The author, incidentally, will be pleased to hear from any Cayuga Lake-trouters, not presently keeping a diary, who want to get in on the fun and, at the same time, help a good cause.—Editor

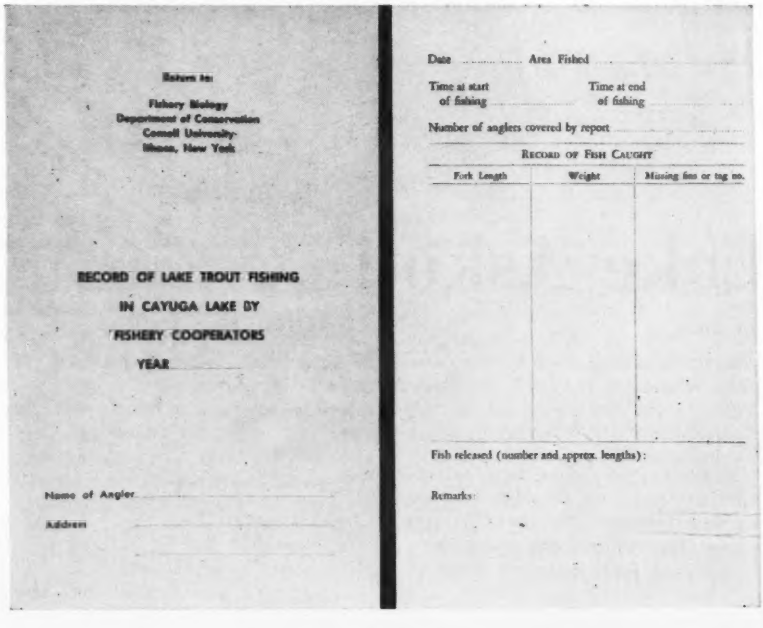
"FISHING NO DAMN GOOD . . ." This was an expressive entry in one angler's diary after a day on Cayuga Lake in search of lake trout. The diary was furnished him by the Department of Conservation at Cornell, who, in co-operation with the New York State Conservation Department, has been studying the biology and management of lake trout in Cayuga Lake since 1946. The angling diary was part of a scheme to provide information on the composition and consistency of the angling catch.

We are glad to say that the diary quotation above was far from typical. In the six years this co-operative venture with anglers has been in existence, a total of 3,800 lake trout fishermen have logged 12,000 hours on Cayuga's water. For this effort they have to show seven and one-half tons of lake trout! As only about 25 co-operators (and their fishing companions) are involved each year it is evident that someone has had some lake trout fishing of note.

The notion of voluntary record keeping in diary form was suggested by Prof. Gustav Swanson, Head of the Department of Conservation, at Cornell. He had seen the idea successfully used in connection with the collection of hunting records in the Midwest. Probably the most widespread use of volunteer recording of catch is in New Zealand. Here the Acclimatization Societies, so-called because of their main interest in introducing non-native species into the Antipodes, have had an expanding system of angler diaries dating to 1934. The Cayuga corps of volunteers evolved from about 200 individuals contacted during a round of talks to local sportsmen's groups in the 1940's. Like many endeavors of this sort it's very easy to get verbal assent, but another problem when it comes to actually keeping usable records.

A facsimile of the diary (cover and sample page) is reproduced here. The information solicited was kept to minimum . . . after all, who wants to cut into valuable fishing time "bookkeeping." Pertinent points of information solicited included date, area fished, time spent fishing, and the number of anglers involved in each report. Lengths and/or weights of the individual fish plus a record of the clipped fins or tag numbers were also requested. Comments on fish released and remarks were optional.

However, many of the anglers had a good deal to say under remarks. Most of it had to do with observations on weather and water conditions, the success of other fishermen, lures used, the extent of lamprey damage on trout caught and items of this nature. One angler religiously recorded the sign of the zodiac along with each day's entry (findings still classified). Diaries were returned to the anglers after the records for each season were abstracted; individual records are considered confidential until they have faded into the anonymity of an average. The recorded details have doubtless given the opportunity for many an angler to



Return to:
Fishery Biology
Department of Conservation
Cornell University
Ithaca, New York

RECORD OF LAKE TROUT FISHING
IN CAYUGA LAKE BY
FISHERY COOPERATORS
YEAR

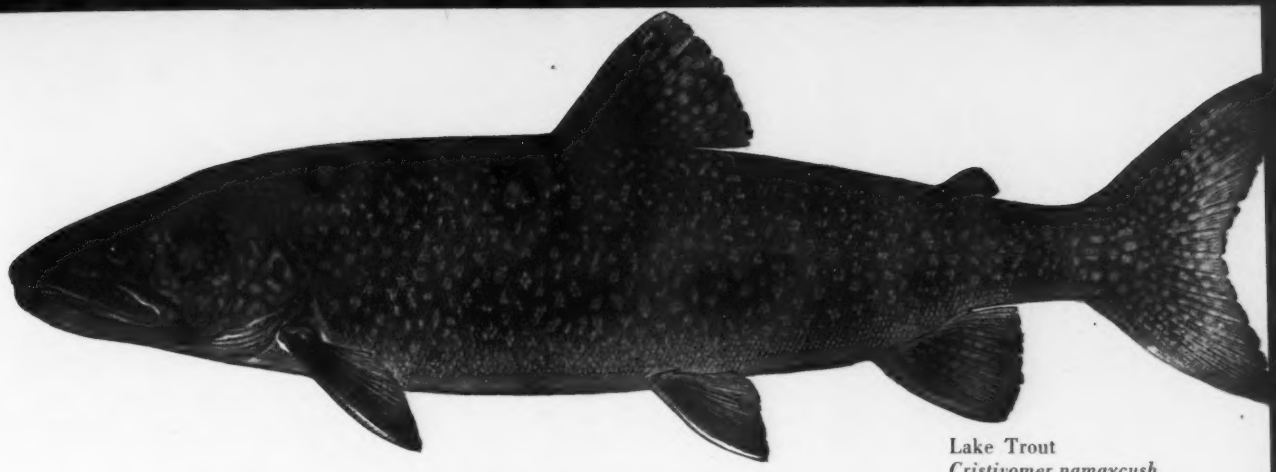
Name of Angler
Address

Date ..... Area Fished .....
Time at start of fishing ..... Time at end of fishing .....
Number of anglers covered by report .....

RECORD OF FISH CAUGHT

Fork Length	Weight	Missing fins or tag no.

Fish released (number and approx. lengths):
Remarks:



Lake Trout
Cristivomer namaycush
(Walbaum)

recall a pleasant day's fishing on Cayuga and perhaps in some measure have added to increased fishing success.

A summary of pertinent catch statistics from these fishing diaries is given in *Table I*. In some ways these data show a rather remarkable consistency and the following comments are calculated to show the usefulness to which information of this sort may be applied in research and management.

The size of the fish taken has varied between 3 1/3 pounds to slightly over 4 pounds, and averaged 3¾ pounds. This suggests that the population tapped by angling has remained comparatively stable during this period. A more detailed picture of the size composition of the catch may be had by plotting the number of fish grouped by one-inch size intervals (*Figure 1*). The peak of this curve at 19 inches indicates clearly that the 15-inch minimum size stipulated by Conservation Law is non-restrictive; i.e., does not function as a regulatory measure. Perhaps the most important reason for this is that the chances of catching larger fish are good and few anglers keep fish at the minimum size permitted by law. It is also true that the larger fish are more vulnerable to the usual angling methods. But the habits of individual anglers are important, too, in determining the shape of this size distribution. Consider, for example, *Figure 2* showing the catch of trout over the years for two different Cayuga Lake anglers, call them A and B. It is clear that angler A has his sights much higher when it comes to "take-home" trout. Fish under 21 inches are very likely to be returned by A (unless fishing is a little tough and there is need for meat on the table). It is evident, though, that angler B is not so choosy. The writer is acquainted with both of these anglers and knows something of their fishing habits so that the interpretation of these two sets of data is not entirely speculation.

Another index of the consistency of the fishing is provided by the catch of trout

Table I

Statistics from Cayuga Anglers' Diaries

	1952	*1953*	*1954*	*1955*	*1956*	*1957*
Total number of fishing trips	468	552	549	586	381	418
Total number of fishermen	602	671	683	750	549	572
Total hours fished	1855	2122	2012	2544	1653	2063
Average hours per trip	4.0	3.8	3.7	4.3	4.3	4.9
Total trout killed	663	704	684	917	503	710
Average fork length (inches)	21.0	21.1	20.1	20.5	20.7	21.7
Average weight (lbs.)	3.8	3.8	3.3	3.5	3.7	4.1
Average catch of trout/hr.	0.35	0.33	0.34	0.36	0.30	0.34
Total weight caught (lbs.)	2505	2692	2265	3170	1843	2920

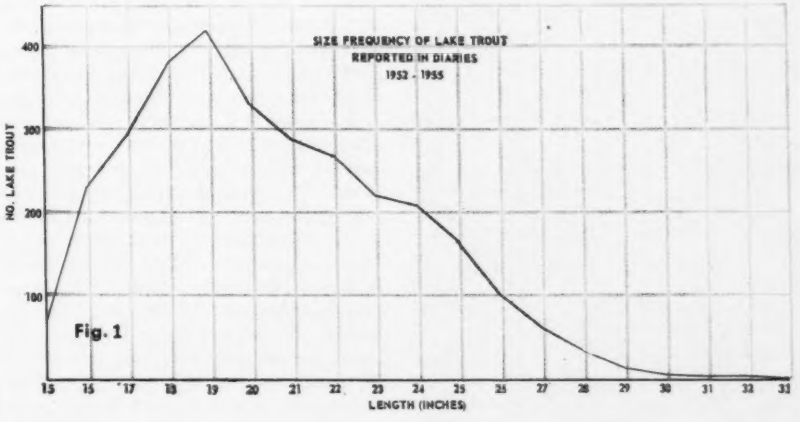


Fig. 1

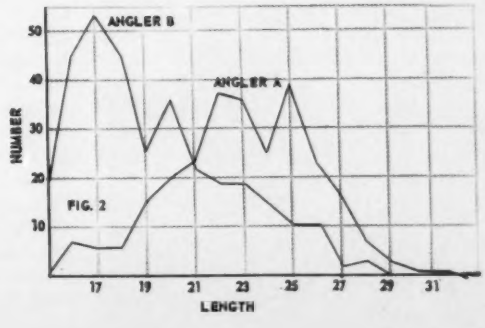


FIG. 2

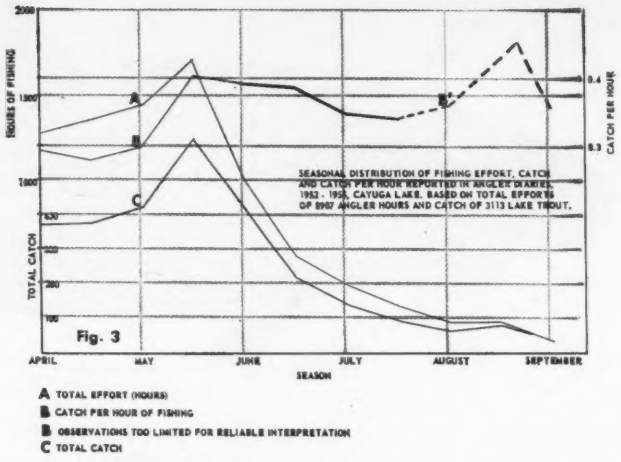
per hour fished. This averages about 0.3 fish per hour without much variation during the period of time covered. Considered in a bit more realistic form, it takes an average of about three hours and 20 minutes of fishing to produce one trout. Like many averages this one is a little misleading. There are many times in the Spring when if you are a law-abiding citizen you pack up your tackle and your three trout limit in an hour's fishing or even less. One has the definite impression when talking with trout fishermen that the Spring fishing is definitely superior. However, more detailed glance at the seasonal catch does not completely confirm this.

The total catch, the total effort, and the index of fishing success (catch per hour) are plotted in *Figure 3*. Total catch and effort are highly correlated as we would expect. Peak fishing takes place in mid-May. The index of fishing success is considered independent of these other two factors, but it also shows a tendency to increase to a peak in mid-May and then remain more or less level throughout the balance of the season. This peak availability in mid-May is likely associated with the inshore movement of the principal lake trout food in Cayuga Lake, the landlocked alewife or sawbelly.

As this fishery is clearly seasonal, one must be a little cautious about interpreting the index of fishing success after late Spring. The fishermen that continue throughout the season are invariably more enthusiastic and skilled. Thus the impression from the continuous high success level may be misleading.

The Spring and Summer fishing for lake trout in Cayuga and other Finger Lakes is quite different. Spring fishing is in shallow water, from boat or shore. Spin fishing has greatly increased the angler's chance of catching fish without being afloat. By late Spring, however, trout descend to 30 feet or so as surface water temperatures increase. By late Summer this depression extends to depths of 50 or 70 feet. When trout move to the deeper water the method of fishing changes radically. One must now use a wire line or some other device for fishing on or near the bottom. This requires infinitely more skill and experience than the simple trolling or casting of early Spring. Experience and knowledge of the lake bottom and general habits of lake trout pay off. It is apparent, therefore, that statistics showing continued high fishing success through the Summer may be the results of including only a select group of experts in late season data.

Fishery managers should know the effectiveness of the daily limit as a regulatory measure. The New York State limit is three trout, excluding the Great Lakes. We can determine the percentage


HOURS OF FISHING
TOTAL CATCH
CATCH PER HOUR
SEASONAL DISTRIBUTION OF FISHING EFFORT, CATCH AND CATCH PER HOUR REPORTED IN ANGLER DIARIES, 1952 - 1956, CAYUGA LAKE. BASED ON TOTAL EFFORTS OF 8957 ANGLER HOURS AND CATCH OF 3113 LAKE TROUT.
APRIL
MAY
JUNE
JULY
AUGUST
SEPTEMBER
SEASON
A TOTAL EFFORT (HOURS)
B CATCH PER HOUR OF FISHING
B OBSERVATIONS TOO LIMITED FOR RELIABLE INTERPRETATION
C TOTAL CATCH
Fig. 3

of fishermen catching no trout, one, two, and three trout per fishing effort from the diaries. These data are given in the tabulation below:

Number of Trout	*Percentage of Anglers*
0	20%
1	34%
2	19%
3	18%

As nearly 20 per cent of the anglers catch the three fish limit, it is obvious that this regulation does restrict catch. In this particular situation, increasing the daily limit would increase the total catch but this is not considered desirable in a sport fishery where the average size of a trout is nearly four pounds. Emphasis here is on spreading the catch among the maximum number of fishermen rather than on maximum harvest by a few skilled or persistent fishermen.

An important potential use of the diaries is yet to be realized. Co-operating anglers keep a record of all tagged fish taken. The original intent was to make use of the ratio of tagged to untagged fish in estimating the total catch of fish from Cayuga Lake. All the accessory information necessary would be the tags sent in voluntarily by non-diary keeping anglers. So far it has not been possible to tag enough trout each year to result in the appearance of very many tagged individuals in the sample of five to nine-hundred fish. The records for 1957 are adequate to show the mathematical procedure, however. The 710 trout recorded in the diaries included eight tagged fish. During the 1957 season an additional 28 tags were recovered and mailed in by non-diary-keeping anglers. As this is three and one-half times the tags recovered by the diary keepers, it is logical to assume that about the same proportion holds with respect to total catch. In other words, 4½ times 710 equals an estimated total catch for Cayuga Lake in the 1957 season. This works out to about 3,200 trout weighing over 6 tons.

This is a minimum figure because not all of the tagged fish that are caught are reported. Unfortunately, it is very difficult to determine this unreported percentage. There are many reasons why tags may not be reported, not all as excusable as that advanced by one angler who apologetically said, "a cat dragged the head under the back steps" (Cayuga lake trout are tagged with a metal band around the lower jaw). Tags may be otherwise misplaced or unnoticed. Some people aren't interested or procrastinate in making the report until they have forgotten about it. We hope we get most of the reports, however, and would like to point out that the anglers contributing tags are performing a service comparable with maintaining the diaries in helping this and any one of several Conservation Department projects involving tagged fish. (We will be concerned with additional important information from tagged fish in Parts II and III of this series describing Cayuga Lake trout investigations.)

This article was written as a token of appreciation to the anglers who have contributed their time and interest to making this part of our research program successful. We hope we have overlooked no one in publishing the names of the co-operators.* A final acknowledgement is also due Mrs. Barbara Little who has painstakingly compiled the diary records each year.

*Area anglers submitting diaries during the period 1953-57 are:
C. Ayers, Delos Bacon, Levi Bacon, C. S. Barker, Ned Boice, John M. Briggs, Robert Brill, John Brooks, Earl Brown, Roger Brown, Donald Bush, the late Ross Church, John Churey, Floyd Compton, W. B. Darling, H. J. Davenport, Briney Dombrowski, Llewellyn B. Egan, Floyd Ferris, William Fowler, Glenn Geltry, Royden Green, Albert E. Greene, Herbert W. Haight, Robert Hancox, James A. Haviland, Byron Hedges, Russ Hess, Duncan Hutchinson, Asa King, G. S. Little, Dana Ludlow, F. A. Lueder, Michael Lynch, Oscar Manning, Glen Marion, Morris Marion, Sanford McCarty, William D. Meils, Kline Messersmith, Carl Moseley, Ralph B. Ness, Keith Norton, Howard Osborn, Clinton Pell, Martin Potter, Joseph Prosch, K. J. Rapalee, Charles Rustyak, Frank Seufert, the late W. N. Smith, Ray Stevens, Fred Storath, R. B. Tallman, Kenneth Vann, R. B. Van Dusen, Herbert Van Ness, John Watkins, Levi Wheeler, Alton Worden

Before Reforestation

Before thinning—note snow damage

Pulpwood from thinning

Plantation Thinning—at a Profit

by E. W. Sears, *Forester, N.Y.S. Conservation Dept.*

FOREST tree planting has been a very popular phase of conservation for many years. As a result there are many thousands of acres of such plantations scattered throughout the State, of varying sizes and age classes. Franklin County, which ranks sixth in the State in total number of trees planted, has many such forest plantations, a considerable number of which are twenty years or more old.

Although tree planting itself has been popular, plantation management in the form of thinning has, until recent years, received relatively little attention from the owners. In general, this can be attributed to inability of plantation owners to find a market for the products of early thinnings. This problem has been solved, in part, through payments for thinnings by the Federal government under the Agricultural Conservation Program and a start has been made in thinning forest plantations by cutting and by chemical methods. However, many persons are reluctant to thin trees from their plantations without some utilization of the products removed. Recent operations in northern Franklin County encourage us to believe that a more complete and satisfactory solution to the problem is at hand. Here, a method has been developed —at least in the older forest plantations —to thin plantations commercially, bring a return to the owner and, at the same time, utilize the materials removed.

In the Spring of 1924, Lincoln D. Kelsey, then Franklin County Agricultural Extension Agent, planted 25,000 red pine, 2-year old seedlings on 20 acres of sandy, barren, idle farm land. His son, Paul M. Kelsey, a toddler of three years at that time, is now the owner of this plantation. He is a District Game Manager for the Conservation Department, at Ithaca. Paul became a co-operator under the Forest Practice Act in October, 1947, and at that time made efforts to thin his plantations, since they showed evidence of stagnation, slow growth, and snow damage. It was a big job, however, and Mr. Kelsey was able to make only a dent.

Then, in the Spring of 1957, the Diamond Match Company plant at Ogdensburg started to use pine for pulpwood from plantation thinnings of suitable size. The Company's action to undertake operations of this nature was prompted by studies and recommendations made by the Department's District Forester, his staff and H. W. Holcomb, Dist. Blister Rust Leader.

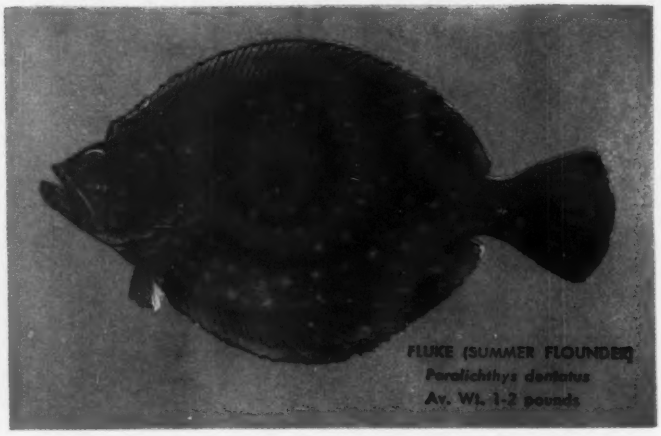
The most practical method thus far developed to harvest such pulpwood thinnings is to completely remove every third row of trees for access, and to remove trees of poor quality in the intervening two rows. The marking of all trees to be removed in the operation is handled by the foresters as a part of the Forest Practices Act Program.

To date, approximately 400 cords of pine pulpwood have been removed from the 20-acre Kelsey plantation *(see photos of before and after appearance of plantation)*. This represents about one-half the total volume of material on the area and indicates a growth rate on this site of about one cord per acre per year. The owner has been paid a stumpage rate for the materials removed and has accomplished his thinning at a profit. Had he been able to do his own thinning, as other owners in the area are doing, he could have realized a substantially greater return from this thinning. Similar operations are being carried out by other plantation owners in the same area.

While the immediate financial returns to the owner are small in this type of commercial thinning of plantations, it is surely a start in the right direction. The Kelsey plantations now have the "growing space" they so badly needed. Even more important, a practical and paying demonstration—through the co-operative efforts of professional foresters, forward-looking landowners and a commercial wood-products industry—has shown the way toward better and more profitable management of our many thousands of acres of forest plantations.

Plantation after thinning

The Fluke of Great South Bay



EVERYONE who fishes the inshore marine waters soon develops a very healthy respect for the water, admiration for the strength of the tides and the power of storm-driven waters, astonishment at the changes each new season brings and wonder at the water's ability to support life in such variety and abundance.

Each year these waters offer to young fish a nursery ground where food such as sand shrimp, anchovy, spearing, and numerous other small forms are available. Each year, too, migrant fluke, bluefish and striped bass enter our inshore waters. They have one thing in mind—*food*—and their appetites are huge. Not only are these food requirements met, but in addition, the water meets the specific temperature and salinity required for the development of eggs produced by spawning fish—flounders, weakfish and kingfish.

The number of people who have come to know and love the inshore marine waters has increased many-fold since the second World War. Population increase alone has had its effect and to this has been added the change toward an active rather than a passive expenditure of leisure time. With this increased activity in outdoor sport, a burst of interest has been generated in the life of the marine waters. People are increasingly curious about the habits of fish: How rapidly do they grow, how often do they spawn, where do they come from and where do they go when they leave our waters? But the most frequent questions are concerned with abundance—why are more fish caught in some years than others, and why is early Summer the best time to fish for fluke? This interest in abundance reflects the understandable desire of sportsmen for more fish in a day's fishing.

Great South Bay, a body of water 35 miles long and 6 miles across at its widest point, connected with the Atlantic Ocean by Fire Island Inlet, lies on the south of Long Island approximately halfway between Manhattan and Montauk Point. It is typical of many bays, for each year fluctuations occur in the abundance of migrant species of fish and in the success of survival of spawned fish. Perhaps the most closely observed for such changes in abundance is the fluke, or Summer flounder, for it provides a great many fishermen with long hours of enjoyment each year. Fluke fishermen, however, do not find all Summers equally productive, and even during a single Summer the fishing success declines month to month. For these reasons an investigation was begun two years ago to learn more of the causes for fluctuations in the sport fishery for fluke. A preliminary report of this study appeared in the December-January, 1956-57 CONSERVATIONIST.

Of course, much more will have to be known about the habits of this fish before attempting to develop a management plan for the resource. Work to secure this information was begun during the Summer of 1956, with a tagging program to study local movements of fluke and the rate of recapture of marked fish by salt-water anglers. Approximately 1,000 fluke, taken by otter-trawl off Sayville in Great South Bay during the month of June were marked with Petersen disc tags, and then released. Tag returns by sportsmen during the Summer demonstrated a distribution throughout the Bay in numbers proportional to the fishing effort in particular areas of the Bay; i.e., more returns were recorded in Fire Island Inlet than off Sayville since the Inlet is a more popular fishing area. Nevertheless, a movement of a large proportion of the population to the Inlet—a distance from the tagging site of 10 nautical miles—was evident in the record of tag returns. This movement can best be attributed to the abundance and variety of the smaller food forms in the Inlet area.

Although the fish moved to the Inlet, no marked fluke were taken outside the Inlet in the ocean by trawl gear until September when these fish normally leave the inshore waters. Because of this, it was at first believed that these results indicated no movement of segments of the Great South Bay fluke population to ocean waters during the Summer months. However, so few tag returns were recorded in September and October in the ocean by otter-trawlers when it is known that large numbers of fluke leave the Bay, it was thought possible that the fishing effort by commercial boats could be of such small magnitude that marked fish, even 'though present in small quantities in the ocean during July or August, would not be landed by the trawlers. A review of the fluke trips and the catch per trip of three trawl boats fishing off Fire Island in 1956 indicated that such was perhaps the case. And so, it is entirely possible that a movement of fluke to ocean waters throughout the Summer can be one factor contributing to the causes for a declining catch per effort of hook and line fishermen as the Summer season advances.

Tagging and release of fluke was repeated in June of 1957 in Great South Bay. Results similar to those described above were again obtained. There was, however, a decided difference in the per cent of returns during the four-month period subsequent to tagging. In this period in 1956, hook and line fishermen recaptured 24 per cent of the marked fish, whereas in the Summer of 1957, only 8 per cent of the fluke marked in June of 1957 were returned. Such a difference in the per cent of recapture of marked fish is complicated by the difference in abundance of fluke in each of the years, but preliminary data indicate that neither the abundance nor the effort expended

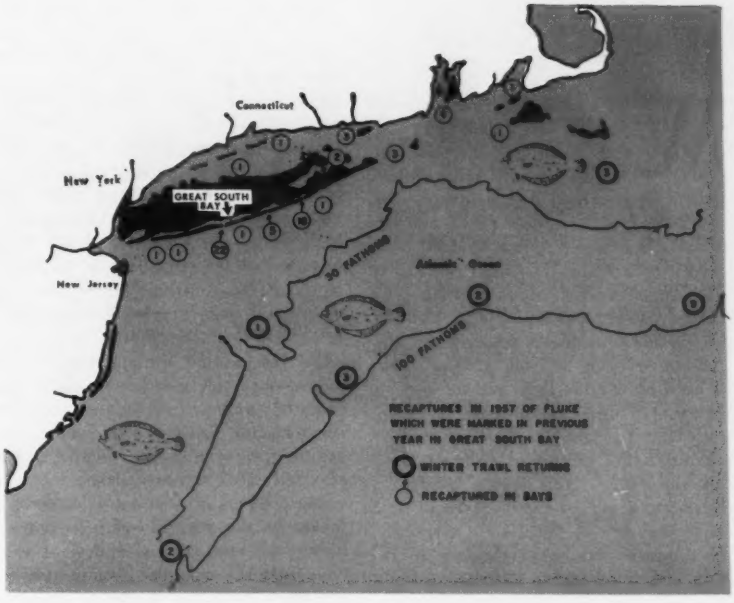
On An Important Fishery Of Our Marine District

by John C. Poole, *Aquatic Biologist (Marine)*

in these years was sufficiently different to explain entirely the great change in the per cent of recaptures. What remains to account, in part at least, for the drop in recapture per cent appears to be a difference in the desire of the fluke present to take bait and hook during one year as compared to the next. That is to say, fluke are more "catchable" in some years; less in others. This is not so difficult to believe, since changes in the abundance of natural foods, such as the anchovy and shrimp, must certainly alter the desire of fluke to accept the killifish, the most popularly used bait. Killifish are not present in the deeper water favored by fluke and are not, therefore, normally eaten—particularly, if more desirable food species are present.

This change in "catchability" is interesting to consider also as a factor contributing to the decline in recapture of marked fish during one Summer's season. It was found, for example, that the feeding habits of fluke altered in Mid-Summer of 1957. Examination of the stomach contents of 250 fluke revealed that in June and July, young-of-the-year flounder were preferred food, while in August and September fluke took advantage of the seasonal peak of young sand shrimp to such degree that they were the most popular food items. Feeding activity, however, was not reduced in any way, for average weights of stomach contents in the two periods studied were almost identical. This change in food preference would appear to indicate that once young shrimp grow and become available to fluke, young flounder as well as killifish no longer have the appeal they had a month or so previous.

During June of 1957, the day-to-day routine of marking and releasing fish was brightened by the appearance in the nets of 4- and 5-pound fluke in comparatively large numbers. These fish had not been available to any great extent in 1956 to the trawl gear used to capture fish for tagging. It was hoped that the presence of these larger fish would serve as indication of a successful sport fishing season in regard to size and abundance of fish caught. Unfortunately, this did not prove to be the case and it was of great disappointment to sport fishermen, particularly those who had experienced good catches of smaller-sized fluke in the Summer of 1956. What suddenly caused these larger fluke to appear in 1957 seemed unexplainable, for their occurrence could not be predicted by any showing of them as slightly smaller fish in the year previous.



However, the reasons for the poor 1957 fluke year in Great South Bay appear now to be better known. From a compilation of the lengths of fluke taken in the past two years and from preliminary age analysis, it appears that the abundance in 1956 of small fluke averaging 12 inches in length was due to entrance of a successful year class into the Great South Bay fishery. It has been estimated that these fish were spawned in the 1953-1954 Winter when conditions were such as to permit a maximum number of young to survive in the wintering and spawning grounds. These grounds lie off Cape Charles, Va., to Nantucket, Mass. in 20 to 100 fathoms of water. This age class contributed significantly to the 1956 sport fishery, and was so heavily fished, both offshore and inshore, that its survivors were too few to add appreciably to the 1957 fishery. The decrease in the abundance of this particular year class, coupled with a relatively poor success of spawning in the Winter of 1954-1955, resulted in a lower level of abundance of fluke available to hook and line in Great South Bay during the 1957 season.

It is interesting to note to what degree fluke marked in 1956 returned to the south shore of Long Island in 1957. Eighty recaptures from this marking were recorded from Buzzards Bay, Mass., south to Long Beach during the Summer of 1957. Fifty of these were taken on the south shore of Long Island, 22 being recorded in Great South Bay. And so, in this year, at least 27 per cent of the fluke tagged in the Bay returned to the Bay itself, and 62 per cent returned to local New York waters. It is also interesting to note that the fishing effort for this fish is intensive, extensive, and of almost continuous effectiveness. During the period of one and a half years since the 1956 marking 38 per cent have been recaptured in waters from Nantucket to Virginia and, with the exception of a short period of one month in Autumn when fluke are available to neither the inshore sport fishery nor to the offshore trawl fishery, the fluke is landed during every month of the year.

A question arises as to the effect upon the fishery of catching less of a dominant year class at small size. For example, if fewer of the small fluke had been taken in the year 1956, would these fish have returned in 1957 in sufficient quantity as 15-inch fish to prime fishing

(*Continued on page* 39)

Turtles of New York

'WAY back in the Permian period, more than 200 million years ago, there appeared a small reptile which scientists have named *Eunotosaurus*. The name means well-backed reptile, referring to the creature's strong, arched spine and very broad ribs. The next geological period, the Triassic, brought forth true turtles, probably descendants of *Eunotosaurus* or his cousins. As you can see, the turtles have been around a long time. And we'll offer odds they will be here in some form or other in the eons to come. Despite the fact that turtles are one of the oldest living groups of animals, they escape the name "living fossils" probably because there are so many of them and because they are so familiar to all of us.

Turtles are commonly thought to be lizards with bony upper and lower shells into which they can retract heads, tails and limbs when danger threatens. Actually, the turtle is only distantly related to the lizards and not all turtles can retract their appendages into their shells. Our own Snapping Turtle, for example, generally ignores such defensive tactics and other turtles find such a maneuver difficult or impossible.

Our turtles with the ability to retract to safety all do so by flexing their necks in vertical "S"-shaped patterns inside their shells. This requires very specialized neck vertebrae. Other turtles referred to as pleurodires, bend their necks in the horizontal plane to withdraw them under the shell. There are no pleurodires native to the United States.

Turtles have as few teeth as chickens. But this bothers them not a whit, as they all are equipped with hard horny shearing jaws efficient alike in chopping up meat or vegetables. Nor do they worry if food is swallowed in chunk-size dimension—their digestive juices are strong enough to take care of almost any vegetable or animal matter and even some mineral matter. This may lead you to believe that turtles care not what they eat as long as it is food. And that is literally true for some of the tribe, but others are often choosy about their diets. Some are strict vegetarians; others complete carnivores.

Turtles, according to Webster's unabridged are: "Orig., any marine reptile of the order of subclass Chelonia; a sea turtle; now any reptile of that group; a tortoise, in the broadest sense of that word." Tortoises, according to the same authority are: "A turtle; a reptile of the group Chelonia; in prevailing usage restricted to the land and fresh-water turtles, or sometimes to the former only." If this leaves you somewhat baffled, you may refer to the latest official list of common names for North American reptiles. Here you find that the name tortoise is used only in reference to land turtles. To make this more confusing, the natural tortoise shell of commerce comes primarily from the Hawksbill turtles, which being sea turtles, by modern usage, aren't tortoises at all. In England the original meaning of both words is used and preferred. This, obviously, is the safest course and proves, incidentally, that the English are pretty smart.

Having settled the question, "What's in a name," let us turn to the status of the turtle under the law. Here (N.Y. State Conservation Law) we find them classified under "small game," with protection afforded the following species: Land turtles, Box and Wood turtles and Tortoises. By the definitions in the preceding paragraph, the Box Turtle is the only true tortoise or land turtle in the State, but since the Wood Turtle is specifically included we might be able to add the Bog Turtle and Blanding's Turtle. In any event it is against the law to capture or keep as a pet the Wood and Box turtles, which, by the way, make about the best pets among the turtles.

Biologists, being orderly persons (usually), have not been content with the terms "upper shell" and "lower shell" but have called the upper shell a carapace and lower shell a plastron. This saves two letters in each case and much confusion. The terms are even more precisely defined, as a carapace is the dorsal shell arising from the backbone and a plastron is the ventral shell arising from the sternum.

All of our turtles are oviparous, meaning that the females lay eggs. The eggs are leathery-shelled and are, of course, fertilized internally by the male turtle. From the shape of most turtles this would seem like a somewhat impossible task. We have noted, however, that turtles have been around some 200 million years, so it's apparent that turtles aren't bothered by the shape they're in. In many species the male is equipped with longer nails on the forefeet than on the hindfeet or on the female of the same species, and the plastron is somewhat more concave. Male turtles almost always have a proportionately longer tail than the female of the same species. This is a good way to tell the male from the female if you have both sexes at hand. This criterion is a little difficult for the novice, confronted with one lone turtle. It may help to know that the vent is further out on the tail of the male than it is on the female.

Portrait of a box turtle

Fortunately the turtles have no trouble telling which sex is which so there is always a seasonal supply of turtle eggs for the gourmet. There seems to be no reason why the eggs of all turtles in the State couldn't be eaten by man except for size and acute discrimination. The same may be said for the turtles themselves. The eggs are buried in sand, soft dirt or vegetation and no further thought or protection is given to them by the turtles. The turtle digs the nest hole with her rear feet, 'though the forefeet may be used in smoothing over the spot afterwards.

Turtles are measured in a straight line from the front of the carapace to the back. The fossil marine turtle, *Archelon*, from the Cretaceous rocks of South Dakota was 12 feet long; he is the biggest one known to science. A fossil tortoise of more recent times in Asia walked around inside a 7-foot carapace. Some modern marine turtles grow at least this large *(see account under Leatherback, following)*.

There is little doubt that some turtles live to a very advanced age. There are at least 31 kinds of turtles which have lived more than 20 years in captivity. One turtle has been recorded as living 152 years, but this is not certain. There are many turtles trundling about the State with dates carved into their shells indicating great ages; the trouble with these data is the ever present impulse of the human species to play practical jokes.

It's impossible, by the way, to tell how old a turtle is by counting the rings on its shell. Only in relatively young turtles can one tell their age by the "annular" rings of the horny shields, or scutes, on the shell.

The horny layer covering the bones of the shell gives no indication of the size and shape of the underlying bones since the joints, or sutures, seldom coincide. Some turtles, like the Box Turtle have hinged plastrons allowing the ends to be folded up, completely enclosing the animal. Other turtles, like the Wood Turtle, lack such hinges and can only pull in as far as possible for protection. There are very few species with hinged carapaces; none of these in the United States.

Since turtles adopted rigid shells they have had to modify their breathing process from that of the usual tetrapod equipped with an expandable rib cage. Turtles breathe air in mainly through muscled diaphragm action. They also use all their lungs with each breath unlike humans who seldom replace as much as 1/3 of the air in their lungs at a breath. Turtles also absorb oxygen from the water and air through their skins which must necessarily be kept pore clean.

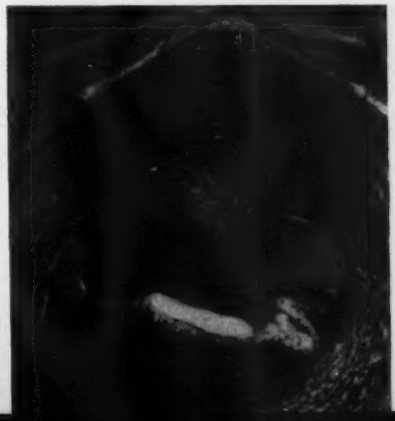
Any boy, given half a chance, will fill the home bath tub or pots and pans with several varieties of turtles. Since turtles are usually easy to care for and eat comparatively little, they make excellent pets. There are few records of children being afraid of small turtles or unfascinated by these creatures. There is a thriving business selling baby turtles as pets. These are generally Map or Troost's turtles, which usually die a slow death from starvation; they may take over a month or two to die. Ones with "cute" painted shells die much sooner as turtles depend on their skin for some respiration, as explained above. If you have one which was covered with paint the paint should be carefully chipped off. Instead of feeding these babies "ant eggs" or dried "turtle food" one should feed them finely chopped liver, meat, fish (with some bones) and some powdered milk. It is best to pick up a full grown wild turtle for a pet and feed it according to its requirements. But remember Tortoises and Wood turtles are protected by law. One should also remember that the aquatic turtles found in New York must be kept in aquaria with a constant supply of water and that they should be furnished with a means of crawling out of water on occasion for "sunning." Most such turtles need to swallow their food while their heads are submerged.

There are 18 different kinds of turtles native to this State. Mr. Trimm's painting in the centerspread shows all of these with the tortoises or least aquatic species in the upper left hand portion; the pond or most aquatic fresh-water turtles in the center and to the lower right our marine turtles. The list below refers to New York State turtles only, as habits, etc. may differ in other parts of the range.

COMMON SNAPPING TURTLE (*Chelydra serpentina serpentina*). Up to 16 inches. A 16-pound specimen had a carapace 13¼ inches long; one, fattened in a swill barrel, weighed 86 pounds. They are found throughout the State, generally in quiet waters, but it has even been recorded from salt-water marshes. Almost entirely carnivorous, may be baited into traps with rotten meat or fish. Hibernates, buried in mud or into banks of ponds and streams from early November to early March. Its eggs are slightly smaller than ping-pong balls and only slightly less bouncy. Its main enemies are the skunk and other egg-eating animals and man. It makes excellent soup and is served in this form in many restaurants. Its meat is also delicious. It does eat young waterfowl and some game fish but it does some good too by serving as a valuable scavenger and by destroying many noxious invertebrates. It has a powerful bite, but *cannot* bite through a broomstick as is believed in many quarters. Just remember, 'though, that your finger is not a broomstick. It will bite while on land, but when encountered in the water thinks only of escape and makes no attempt to bite. The best way to handle them is by the tail at arm's length well away from human legs, etc. The eggs may be used in place of chicken eggs in cakes, etc., but seldom are.

STINKPOT (*Sternotherus odoratus*). Up to 5 inches. Found throughout the State in permanent bodies of water. Very aquatic. Hibernates in wet debris or mud of pond and stream bottoms. Mainly carnivorous. Snails, clams, insects, crayfish and carrion form the greatest part of the diet. The Stinkpot is not an abundant turtle

A "snapper" is a mean character



by Dr. Edgar M. Reilly, Jr.,
Curator of Zoology,
N.Y.S. Museum

in the State and is only locally common. It appears in mid-March and starts hibernating in late October. These turtles could be eaten, but their name, which is an earned one, explains why they are not, at least by New Yorkers. They make interesting pets but, like all aquatic turtles, require a good water supply. Earthworms are gobbled avidly in captivity especially if the worms are wriggling.

EASTERN MUD TURTLE (*Kinosternon subrubrum subrubrum*). May reach 5 inches. Found only in southeastern-most part of the State and rare even there. Prefers shallow ponds and ditches with aquatic plants; may be found in variety of places including brackish water. Hibernates in mud or decayed wood. Plastron has one hinge enabling turtle to close openings almost completely. In captivity these turtles will eat almost everything; not much is known of food preferences in the wild. May be eaten but size, rarity and muddy habitat are against it ever being popular.

SPOTTED TURTLE (*Clemmys guttata*). Seldom more than 5 inches long. Very aquatic preferring meandering streams, small bogs and ponds. Throughout the State but not common especially where there are few ponds. Hibernates, probably, in mud under ponds, etc. from October to the end of March. Eats mostly small invertebrates and insects; some plant life and vertebrates such as frogs, salamanders and tadpoles. Main value to man apparently aesthetic as too small to be eaten with any regularity; makes an attractive pet.

WOOD TURTLE (*Clemmys insculpta*). May measure 9 inches; usually about 7 inches. Throughout the State in woodlands and meadows in Summer and into woodland brooks and ponds in Spring and Fall. Enters hibernation by early October, leaves late March; usually hibernates in deserted muskrat burrows along stream edges. Omnivorous, but seems to prefer vegetables, particularly the more succulent types and fruits and berries as well as mushrooms. These are protected by State law and should not be eaten except in emergencies. They do no damage to game fish, etc. It is against the law to keep these as pets in this State although they are excellent for this purpose as they do not need to be kept in water and will eat easily obtained vegetable matter.

(*Continued on page* 26)

COMMON SNAPPING TURTLE
WOOD TURTLE
MAP TURTLE
Turtles of New York
BLANDING'S TURTLE
SPOTTED TURTLE
BOG TURTLE
ATLANTIC
ATLANTIC HAWKSBILL
STINK POT
EASTERN MUD TURTLE

ATLANTIC GREEN TURTLE
ATLANTIC RIDLEY
ATLANTIC LOGGERHEAD
ATLANTIC LEATHERBACK

(*Continued from page* 23)

BOG TURTLE (*Clemmys muhlenbergii*). Measures up to 4 inches. In this State locally common in two separate areas: southeastern and central regions. Prefers sphagnum bogs, small streams and wet meadows; may be found on dry land. Very little is known of the habits of this species; nothing about hibernation and it is believed to be omnivorous. A captive ate earthworms under water although one authority believes they eat only on dry land.

BLANDING'S TURTLE (*Emys blandingii*). May reach over 9 inches but are usually about 6 inches long. Rare and local through most of State but absent in extreme northern part. Hibernates in mud or under trash. Formerly believed to be mainly terrestrial, but now known to spend much time in water. It is practically omnivorous living mainly on invertebrates in the aquatic habitat and on land eating more plant food. These turtles make excellent eating and in Ohio many are sent to market. They may compete somewhat with game fish for food supply.

EASTERN BOX TURTLE (*Terrapene carolina carolina*). Up to 6 inches in length. Found throughout the State, but only rarely locally common, generally in open woodlands but near brooks and ponds. Hibernates in loose soil. The only really true tortoise in the State; it does enter water on occasion. Specifically protected by New York State law. The young are mainly carnivorous and the adults largely herbivorous. Food ranges from insect larvae, snails, worms and slugs to fungus, berries and fruit. People are occasionally poisoned from eating box turtles, but this may be because these tortoises eat poisonous mushrooms apparently with impunity to themselves. They are of no economic importance to man. The male's eyes are usually a red color, often bright red while the female's eyes are gray brown or dark reddish brown: the vent of the male is nearer the tip of the tail and he has a slight concavity on the rear part of the plastron otherwise the sexes are hard to tell apart.

NORTHERN DIAMONDBACK TERRAPIN (*Malaclemmys terrapin terrapin*). May reach 9 inches but are usually 7 to 8 inches long. Found in tidal shore waters and up the Hudson River. Hibernates in bottoms of streams and ponds. Eats crustaceans and molluscs. The delight of the epicure—the most tasty of all turtle meats. Raised commercially for market and thus of some economic importance, but not as popular as in former years. The Terrapin is rare in our State in the wild, but is making a comeback after serious depletion. The females are larger than the males of comparable age and have shorter tails and bigger heads.

Yellow-spotted pond turtle

MAP TURTLE (*Graptemys geographica*). May reach 11 inches. Of local distribution throughout the State. Prefers backwaters and sloughs of rivers and lakes to ponds. Is almost strictly aquatic. The main food item is fresh-water molluscs, but they also eat crayfish, aquatic insects, fish and carrion. Very edible but not marketed, at least in New York. The female is larger than the same age male. It is not an important fish predator and its value to man is probably negligible.

EASTERN and MIDLAND PAINTED TURTLES (*Chrysemys picta picta*) and (*Chrysemys picta marginata*). Usually reaches 6-7 inches in length. Found throughout the State with the ranges of the two subspecies meeting in central New York. The Eastern Painted Turtle has a clear yellow plastron while the Midland Painted Turtle has a yellow plastron with a central bisymetrical dusky figure. Prefers quiet ponds, marshes and protected lake shores; it is very aquatic leaving water mainly to lay eggs although it basks on floating logs and vegetation. It is omnivorous and generally swallows its food under water. The flesh is palatable but the turtle is usually considered too small. They make excellent pets although they must be kept in aquaria with floating logs or places big enough for them to crawl onto out of the water. Females are larger than males of equivalent age. The longest claws on the forefeet of the males are two to three times as long as those on its rear feet. They are of little economic or conservational value.

RED-BELLIED TURTLE (*Pseudemys rubriventris rubriventris*). May reach 16 inches but usually about 10 inches. Found only in southeastern part of the State in lakes, ponds, rivers, creeks, marshes, brackish water and even salt-water marshes from where it may now have been extirpated. Apparently does not hibernate. Almost as good eating as the Terrapin. Omnivorous; apparently needs to swallow food under water.

ATLANTIC GREEN TURTLE (*Chelonia mydas mydas*). Recorded up to 850 lbs. but a large one today would measure 4 feet in length and weigh about 500 lbs. A strictly marine turtle only rarely reaching Long Island and laying its eggs on more tropical shores. The turtles come out of the sea only to lay eggs which are considered delicacies.

Eastern painted turtle

It is mainly herbivorous in diet but will eat jelly fish, molluscs, crustaceans and, in captivity, fish. Actually very little is known of the life habits of this species despite the fact that it is a staple of diet in the warmer regions of the world. Its meat, eggs, and soup made from its flesh, are considered among our finest foods. It is hunted so assiduously that it is becoming quite rare throughout its range.

ATLANTIC HAWKSBILL (*Eretmochelys imbricata imbricata*). These reach 280 lbs. in weight; length reaches about 34 inches. Another strictly marine turtle only rarely reaching the shores of Long Island. Practically nothing is known of their life history. They eat both animal and vegetable food, captives thriving on fish and meat. They are hunted for food and their eggs are also eaten. Their outer shell is the famous tortoise shell of commerce. Plastics have reduced the demand somewhat but the turtle is still hunted for its shell and as a result is not a common sea turtle. Some of the hunters would remove the scales from the living turtle in the belief that the animal would then regenerate a new shell; this may happen if care is used in removing the original shell.

ATLANTIC RIDLEY (*Lepidochelys olivacea kempi*). Seldom longer than 2 feet. Coastal marine, rare in our waters. The only known food is crabs. The life history is virtually unknown, despite it being fairly common in some regions. Not as good as the Green Turtle for meat or soup; it is eaten as are its eggs. It is a nervous, vicious animal and should be handled with care if at all.

ATLANTIC LOGGERHEAD (*Caretta caretta caretta*). Usually 35-40 inches long, formerly much larger Loggerheads may have existed. Today a big one weighs about 300 lbs.; former weights, none authenticated, have been listed as high as 1,200 lbs. Coastal marine but wanders well into estuaries. It is more northern than the three previous described marine turtles. Mainly carnivorous: Crabs, conchs, clams, oysters, sponges, jellyfish, some fishes and some vegetation. Of no economic importance in this State, but the turtle and its eggs are a major food item in Antillian area and Key West. They can be vicious and are powerful opponents in open sea capture or kills.

EASTERN SPINY SOFTSHELL (*Trionyx ferox spinifera*). The shell is a wide oval which may reach a length of over 15 inches. It is common in western New York less common in central New York and possibly or formerly along the Ontario Lake plains and into the St. Lawrence River. Its shell is soft as the name asserts, but it is still tough and leathery and furnishes enough protection according to the animal's habits. The shell is an advantage in sliding under the mud and ooze of river bottoms and flat enough so the bump is rarely discernible to would-be predators. Mainly carnivorous with a strong preference for crayfish and other invertebrates; some plant food eaten. May compete with game fish for food, but generally harmless to man and his interests; considered by many to be the finest tasting fresh-water turtle. Very aquatic preferring larger slow moving rivers, but also found in lakes, ponds and smaller streams.

ATLANTIC LEATHERBACK (*Dermochelys coriacea coriacea*). One of the biggest marine turtles; an individual is recorded with a carapace 8 feet long and a weight of "nearly a ton"; a total length of over 7 feet from the tip of the nose to the tip of the tail is not unusual and many weigh over 1,000 lbs. They are more completely specialized for an aquatic existence than any other turtle. They are called leatherbacks because their shells are covered with a black leathery skin. It is very rare off Long Island, but is a confirmed pelagic wanderer of the warmer seas. Very few stomachs have been examined and in each of these traces of both plant and animal food have been found indicating that the animal is probably omnivorous. Its eggs are eaten when found and an oil is extracted from the animal, but its meat is apparently not well thought of by man and it is too rare to be of any economic importance.

CONSERVATION-WISE the turtles would seem to be of little importance being neither very harmful nor very helpful. They are, however, interesting animals and make attractive pets and we would miss them very much should they disappear from the face of the world. If man should decide to eliminate any of the species he would do well to consider that he may be upsetting a delicate balance in our lakes, ponds, rivers and streams which is not obvious to us now. Should one wish to find out more about our turtles the following two books are highly recommended: Pope, Clifford H., *Turtles of the United States and Canada*, Alfred A. Knopf pub., N. Y., 1939. Carr, Archie *Handbook of Turtles*, Comstock Pub. Assoc., Ithaca, N. Y., 1952.

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Wetlands vs. Drainage

Congressman Henry S. Reuss, conservation-minded solon from Wisconsin, has proposed a way to halt the tax-subsidized drainage that has been eating away the last important waterfowl-nesting area left in the United States—the prairie-pothole region of the Dakotas and western Minnesota. He has introduced a bill to eliminate the drainage subsidies paid to farmers under the Agricultural Conservation Program and to substitute, in lieu thereof, incentive payments for preserving valuable wetlands under the Conservation Reserve part of the Soil Bank.

Mr. Reuss was joined in sponsoring the plan by Congressman McGovern of South Dakota, who represents a district in the heart of the pothole country. Mr. Reuss' bill is H.R. 10641; Mr. McGovern's identical measure is H.R. 10642. Both were referred to the House Committee on Agriculture.

Congressman Reuss was responsible last year for setting up a public hearing on drainage subsidies by the Intergovernmental Relations Subcommittee of the House Committee on Government Operations, of which he is a member. He said the proposed legislation was drafted by himself and Mr. McGovern largely as a result of the record of the hearing, plus additional studies of the problem in the field.

Federal drainage subsidies, he asserted in introducing the measure, have already destroyed almost one-third of the Nation's finest breeding grounds for migratory waterfowl. He pointed out that acting under the Soil Conservation and Domestic Allotment Act of 1938, the Secretary of Agriculture has designated drainage as an eligible conservation practice, thereby permitting federal ACP payments to farmers of 50 per cent of the cost of such drainage. In addition the Soil Conservation Service has provided the necessary engineering and technical assistance for drainage projects entirely without cost to the farmer.

The so-called prairie-pothole region includes 39 counties of eastern North Dakota, 44 counties of eastern South Dakota and 57 counties of western Minnesota. Of the 1,350,000 potholes in this region at the start of the subsidized drainage program, Mr. Reuss asserted, more than 350,000 have been eliminated through Federal subsidies. He placed in the Congressional Record specific data showing that from 1951 to 1955 the Agricultural Conservation Program Service spent 83 times as much money ($5,639,723) to destroy 256,700 acres of waterfowl habitat as the U. S. Fish and Wildlife Service was able to spend from Duck Stamp funds ($67,613) to save only 3,462 acres in the same three states.

All About Honeybees

by Arthur W. Holweg, *Supervising District Game Manager*

We Owe More Than You May Know to These Fuzzy-Legged, Golden-Hued Immigrants from Sunny Italy

ACCORDING to the authorities who have studied the bee in its relation to agriculture we could get along without the honey, but not very well without the honeybee. Dr. E. J. Dyce, Extension Apiarist, at Cornell University, has the following to say regarding the important function of the honeybee:

"The pollination of agricultural crops is the greatest contribution of honeybees to our national economy. While it is impossible to estimate the value of honeybees for pollination, it is many times the total value of the crops of both honey and beeswax. Without the service of insects many crops would not set seed or produce fruit. Many insects other than honeybees perform this service but their numbers have in some areas become so reduced that honeybees are now by far the most numerous and important pollinating insects.

"Several conditions have contributed to the decline in native pollinating insects. Over the years there has been a progressive trend toward intensive and specialized agriculture. Areas formerly devoted to general farming are now planted to fruit trees and to other specialized crops. Much of the land in these areas is undergoing constant cultivation and no longer produces enough nectar and pollen-bearing plants to maintain pollinating insects. In many situations there is little waste land between the plantings for the nesting and hibernation of native beneficial insects. The increasing use of insecticides, especially in the form of dusts, has not only forced beekeepers to move bees from fruit areas, but has reduced the number of native pollinating insects in some areas almost to the vanishing point."

There are some 400 species of bees in New York State. Of them all, the honeybee is the most common, despite the fact that it is not one of our native species of bees. Honeybees are unique, too, in that they alone—of the whole group—are the only social bees that can be handled by man.

The honeybee is the only pollinating insect that can be moved freely and concentrated in great numbers. In New York's orchard areas alone probably 10,000 colonies of honey bees are rented and moved into the fruit growing regions each year during the flowering period to insure good pollination and consequently good fruit production. An additional several thousand are rented to perform the same service in other fruit, vegetable and seed producing sections. Between 500 and 1,000 colonies are used in the Champlain Valley to insure a good set of birdsfoot trefoil seed.

This widespread movement of hives creates a serious problem in disease control among bees and keeps the staff of inspectors in the Department of Agriculture and Markets extremely busy from early Spring to Fall. In fact, in the late 1890's this matter of bee diseases became so serious in the State that it appeared commercial bee keeping was doomed. The appointment of inspectors to bring about the necessary control saved the day. Today a systematic inspection program is carried out covering practically the whole State, with special attention being given to areas where infection has been found. The magnitude of this work is indicated by the fact that in 1957, more than 71,000 colonies were inspected. Of this number 854 were found to have American foulbrood, the deadliest disease of bees and the one that makes the inspection program so vital.

The 189,000 colonies of bees in the State in 1957 produced more than 11½ million pounds of honey. In most years clover honey ranks first in commercial production in New York. In this group of light colored honeys come alfalfa and basswood also, but much less important quantitatively. In second place comes the Fall flower honey composed of about 75 per cent of goldenrod and with the rest largely from asters. Actually, the types of honey are legion but the less common have a restricted local distribution, usually. Sumach, raspberry, wild thyme and purple loosestrife honeys are produced in considerable quantities in some years.

The honeybee was introduced into this country from Europe about 1638 and was called the "white man's fly" by the Indians. This was the black or German bee, a nervous, irritable bee and hard to manage. The Italians, though, had a bee of sunny disposition and about one hundred years ago, this species bee was introduced to this country. Today, more than 90 per cent of beekeepers prefer the mild-mannered and sturdy Italian bee to other races.

The bee colony is a highly developed social organization even though it may contain 50,000 to 75,000 individual bees. As is well known, the colony consists of three types of individuals—the queen, workers and drones.

The queen is a miracle of specialization. She lays the eggs and that is her sole duty. She in no way rules the hive, is fed, cleaned and cared for by the worker bees. In the course of 24 hours she may lay the equivalent of her own weight in eggs—1,500 or more, each in a separate waxen cell.

The worker bees are undeveloped females. A good colony during the active gathering period should have at least 60,000 such workers. They gather pollen to feed the larvae, clean, guard and ventilate the hive. They bring water, propolis (bee glue) and nectar to the hive where the hive workers convert the nectar into honey.

A healthy hive contains various age groups, and the younger workers first feed the larvae, then care for the queen or clean cells, serve as hive guards and finally gather nectar and pollen. Their hairy bodies catch the pollen which they transfer to pollen baskets formed by stiff bristles on their hind legs. Their curled sucking tongues gather the nectar which they store in their honey stomachs. On their return to the hive the nectar is ripened into honey and placed in the combs. The workers simply wear themselves out within the space of a few weeks. As they perish, the replacement workers started by the prodigious feats of egg laying by the queen and nurtured by the workers, fill the ranks. The Autumn-born workers live for six months or more as a result of the slowing tempo of the life in the hive. Except in rare instances, Autumn is the time when the drones are turned out of the hive to husband the Winter's food supplies of honey. So concerned is the colony for its survival that a great surplus of drones is produced in the Spring to insure the mating of the virgin queen. In the case of a successful mating the

Old Cornell University apiary—1898

New Cornell University apiary—1958

drone meets his death in the experience. And those who have been unsuccessful, but nevertheless pampered up to this time of year, are finally thrust out of the hive in the Fall.

Scientists have studied the honeybee for a long time, but it remained for an Austrian naturalist, Karl von Frisch, to add important and startling information to the world's knowledge of the honeybee. He began his studies about fifty years ago and proved that the bee had good color perception except that it is color blind to red. As he experimented it became clear, too, that bees must have some means of communication. A good food source discovered by one member of the hive was soon visited by others from the same hive. To find out how this information was transmitted he constructed a special hive with single honeycombs which could be viewed through a glass plate. Before long he discovered that the bees had a system for imparting definite information on where they had found a rich food source. Their antics he described as a dance and the better the food the more vigorous the dance. A nearby location was announced by a circular dance and one more distant by a wagging dance repeated in a line that gave its angle from the sun. Amazingly, the dark interior of the hive and even a cloudy day do not prevent the bees from orienting themselves in relation to the sun. Through observing and taking food from the dancing bees the other hive bees soon receive the message and hurry from the hive to discover shortly, the same food.

There is little wonder as one begins to study the bee that so many people keep a few colonies as a hobby. About $30 is enough to get one started, so expense is not great. A single man carrying on a commercial business can care for 400 to 500 colonies. Depending on his interest and available time, an amateur could take care of a good number of hives. But one or two would be well to start with and expansion considered later. The largest apiary operator in New York has 3,000 colonies in about 60 bee yards in several counties. The most concentrated present-day bee yards in New York do not contain over 100 colonies and the average is between 30 and 50.

The best honey producing sections in the State are to be found in the St. Lawrence River Valley in Jefferson and St. Lawrence counties and in a strip from Amsterdam to Batavia. Year in and year out the production of extracted honey should average better than 75 pounds per colony. In better sections the average is over 100 pounds. A person who keeps a few colonies of bees as a hobby should be able to compete with the professional

(*Continued on page* 37)

New Laws for 1958

Summary and Review

by Earl A. Westervelt

THE 1958 session of the Legislature acted on a host of bills many of which were signed by the Governor to become law. We have selected those which we feel are of particular interest to sportsmen and conservationists and, herewith, give a brief summary. If the reader finds items of special interest, he should consult the complete law. As the majority of laws passed pertain to fish and game, references are to the Fish and Game Law unless otherwise noted.

FISH AND GAME

Fish

Black bass (Section 262)—Makes it legal to take black bass of any size and in any number from the second Saturday in April through November 30 in the Grass River and its tributaries above the High Falls dam in the Village of Pyrites in St. Lawrence County. (Effective 2/13/58.)

Black bass (Section 262)—Establishes a minimum size limit of 9 inches and a catch limit of 6 per person per day for black bass in the Wallkill River. (Effective 2/13/58.)

Pike (Section 262)—Establishes an open season from May 1 to November 30 for northern pike and pike-perch in Silver Lake, including the inlet and outlet, in Wyoming County. (Effective 5/1/58.)

Splake (Sections 154, 261, 262)—Fixes the same seasons, size limits and catch limits for "splake" as now apply to brook trout. (Effective 7/1/58.)

Trout (Section 262)—Makes clear that catch limits for trout (except lake trout) apply to the aggregate of all species of trout covered by the law. (Effective 3/19/58.)

Nets (Section 323)—Prohibits the taking of fish other than by angling, in the Nissequogue River on Long Island—except for use of nets not more than 20 feet in length and 4 feet in depth operated by hand to take bait fish during daylight hours only. (Effective 3/3/58.)

Bait (Section 268)—Adds Fulton County to those in which the use of fish as bait in waters inhabited by brook trout is prohibited. (Effective 1/1/59.)

Carp (Section 272)—Provides that all carp and goldfish taken in licensed minnow nets shall be destroyed immediately. (Effective 7/1/58.)

Nets (Section 323)—Continues indefinately the authority of the Conservation Department to issue licenses for gill nets, pound nets and trap nets for taking menhaden, shad and herring from March 15 to June 15 in the waters of the Marine District in Richmond County. (Effective 7/1/58.)

Licenses (Section 213)—Provides for reciprocity of fishing licenses between New York and Connecticut in the waters of Mianus Reservoir which lies partly in New York and partly in Connecticut. (Effective 3/3/58.)

Bait (Section 273)—Provides that licenses to take aquatic insects for sale as bait shall be issued at the discretion of the Conservation Department and only to residents of this State or of a State in which New York residents may obtain a similar license or may take such bait for sale without license. (Effective 2/13/58.)

Lake George (Section 171)—Eliminates the provision requiring the Conservation Department to establish areas closed to fishing in Lake George, but retains Department's authority to close any waters of the State to fishing because of severe drought conditions. (Effective 7/1/58.)

Catharine Creek (Section 268) — Extends the special fishing regulations contained in this Section to all tributaries of Catharine Creek below the first water falls impassable by fish and clarifies the area at the lower end of Catharine Creek which is exempted from these regulations by specifying the demarcation line as the most northerly bridge in the Village of Montour Falls. (Effective 10/1/58.)

New York reservoirs (Section 174)—Continues until July 1, 1961 the authority of the Conservation Department to regulate by order, fishing in waters of the New York City water supply open to the public, subject to the approval of the New York City Department of Water Supply, Gas and Electricity. (Effective 7/1/58.)

Trout (Section 262)—Extends the trout season through September 30 in all water in the Counties of Queens, Orange, Rockland, Dutchess, Putnam and Westchester. (Effective 4/15/58.)

Trout (Section 261)—Provides that for a period of three years, through December 31, 1960, the Conservation Department shall be authorized to establish by order the opening and closing dates for taking brook, brown, lake and rainbow trout in Cayuga, Seneca and Skaneateles lakes, with the provision that such seasons be established within the period April 1 to December 31. (Effective 7/1/58.)

Game and Furbearers

Deer tag (Section 234)—Requires a hunter taking a deer under a big game license to fill out immediately both the "Original" and "Duplicate" tags attached to such license. (Effective 10/1/58.)

Muskrat marshes (Section 258)—Increases from $1 to $10 the fee for registered muskrat marshes and liberalizes the requirements for obtaining permits to include certain closed season periods if an over-population of muskrats exists. (Effective 7/1/58.)

Raccoons (Section 201)—Continues for an indefinite period the provision that raccoons injuring property on occupied lands may be taken at any time by the owners, occupants or agents. (Effective 7/1/58.)

Rabies (Section 205)—Extends for one year the provisions for financial assistance to counties participating in control of rabies in wildlife. (Effective 4/1/58.)

Trapping (Section 252)—Continues authority of the Conservation Department to fix, by order, the open seasons for raccoon, skunk, muskrat and mink until July 1, 1961. (Effective 7/1/58.)

Seasons (Sections 226, 228)—Continues authority of the Conservation Depart-

ment to fix, by order, the open seasons and bag limits for black, gray and fox squirrels, varying hare, cottontail rabbits and pheasant until July 1, 1961. (Effective 7/1/58.)

Raccoon (Sections 226, 228)—Authorizes the Conservation Department to fix hunting seasons and bag limits on raccoon until October 1, 1961. (Effective 7/1/58.)

Turkey (Sections 226, 228)—Authorizes the Conservation Department to fix hunting seasons and bag limits for wild turkey and to include provisions for regulating their take, possession and disposition. This would be effective only when the Department determines that a season is warranted. (Effective 7/1/58.)

Deer (Section 226)—Authorizes the Conservation Department to fix an open season in 1958 for taking deer of either sex in Putnam County on the last day of the regular season by holders of special permits to be issued by the County Clerk according to a quota to be determined by the Department. Similar provisions which were in effect in 1957 for Sullivan and Ulster counties were not continued. (Effective 4/8/58.)

Deer (Section 387)—Makes the illegal taking of *any* deer a misdemeanor. Previously it applied to doe deer only. (Effective 4/9/58.)

Deer (Section 234)—Provides that the untanned hide of a legally taken deer may have the evidence of sex removed "for the purpose of preventing deterioration and rotting" provided that a tag bearing the taker's name and big game license number is attached to the hide and remains attached until the process of tanning is commenced. (Effective 7/1/58.)

Big game seasons (Section 226, 230)—Continues the dates of the big game season as they were in 1957. Also, continues the authority of the Conservation Department to fix by order open seasons in the Southern Zone for taking deer of either sex until December 31, 1959. (Effective 7/1/58.)

Fox (Section 250)—Extends to the years 1958 through 1961 the period during which foxes may be trapped at any time in any county of the State. (Effective 7/1/58.)

Field trials (Section 351)—Permits field trials, in which liberated game birds are taken by shooting, to be held on licensed shooting preserves at any time. (Effective 4/14/58.)

Other

Clams (Section 313)—Continues for an indefinite period the authority of the Conservation Department to fix open seasons and size limits for surf and hen clams in waters of the Marine District. (Effective 7/1/58.)

Illegal devices (Sections 380, 381, 384)—Clarifies procedure for seizure, forfeiture and disposition of devices illegally used or possessed and fish and game illegally taken or possessed. Also clarifies procedure for abatement of nuisances such as traps, snares or nets illegally set. (Effective 10/1/58.)

Trout streams (Section 180)—Broadens the prohibition against disposing of earth, soil, refuse and other solid substances in trout streams to include the banks of such streams. (Effective 7/1/58.)

Pigeons (Section 185)—Specifies the New York City Department of Health as the agency authorized to issue permits to trap pigeons in New York City when they have become a menace to public health. (Effective 3/18/58.)

Armed forces (Section 213)—Continues the provision entitling members of the Armed Forces in active service to hunt, fish and trap without licenses except that a big game license is required for deer and bear and a trapping license is required for beaver and otter, until July 1, 1959. (Effective 7/1/58.)

Back tag (Sections 212, 219)—Provides for issuance of a hunting license back tag with each hunting and combined hunting and fishing license to be displayed in the same manner as the big game back tag while the licensee is hunting. Makes it an infraction punishable by forfeiture of his license and by a fine of not less than $5 nor more than $10 for a licensee to fail to display the back tag while hunting. Arrest for such infraction can only be upon warrant. (Effective 10/1/59.)

Penalties (Sections 387, 388)—Increases the criminal fines and civil penalties for certain violations of the Fish and Game Law; classifies the taking of fish by use of hands as a misdemeanor and places violations with respect to wild turkey in the same category as general deer violations. (Effective 10/1/58.)

Hawks and owls (Section 154)—Deletes the great horned owl, sharp shinned hawk, Cooper's hawk and goshawk from the unprotected wild birds list (it adds these species to the list of protected birds) but permits owners or occupants of lands, members of their immediate households and their employees to kill hawks, and great horned owls harassing or destroying poultry and other property on such lands. (Effective 10/1/58.)

Bounties (Section 225 of the County Law)—Adds St. Lawrence County to those counties in which the board of supervisors may establish bounties on bobcats, wolves, coyotes, coydogs, foxes, porcupines and rattlesnakes. (Effective 4/12/58.)

Penalties (Section 219)—Provides that the Conservation Department may revoke a hunting license or the hunting privileges of a combined hunting and fishing license of a person between 14 and 16 years old who hunts wildlife with a gun or long bow, if not accompanied, when so doing, by a parent, guardian or other adult as prescribed by law. (Effective 10/1/58.)

Licenses (Sections 219, 223) — Requires the applicant for a hunting, fishing or trapping license to state whether he has ever been convicted of any violations of the Fish and Game Law, or made a civil compromise with respect to any violation of the Fish and Game Law. Mandates the Conservation Department to establish by order requirements of eligibility for licenses. (Effective 10/1/59.)

Management Act funds — This law appropriates $135,000 from the General Fund for the purposes of the Fish and Wildlife Management Act which was enacted last year. (Effective 4/1/58.)

Negligence with guns (Section 217)—Requires Conservation Department to revoke the hunting or hunting and fishing license when it is established upon hearing that such person negligently fired a gun so as to endanger life or safety of another. (Effective 4/23/58.)

BOATS AND BOATING

Boats Lake George (Section 33, Navigation Law)—Makes it unlawful to launch, moor, dock or operate any craft on Lake George, its tributaries or outlets, equipped with toilets or other sanitary facilities which discharge into such waters, and provides, further, that facilities not conforming to such requirements be removed or sealed. (Effective 4/14/58.)

(See also "Motor Boat Legislation" by Assemblyman Cuisick, page 14, this issue.)

FOREST PRESERVE

Forest Preserve (Section 50, Conservation Law)—Authorizes Conservation Department to dedicate, use, sell or exchange parcels of Forest Preserve lands, outside of Adirondack and Catskill State parks, of not more than 10 contiguous acres in area and not acquired for forest or wildlife conservation practices; with proceeds to be deposited in Forest Preserve expansion fund hereby established. (Effective 4/19/58.)

MISCELLANEOUS

Dogs (Section 126, Agr. and Mkts. Law)—Permits cities, towns, and villages, by ordinance, to impose penalty for offense of owning or harboring unlicensed dogs, of not more than $10. (Effective 3/26/58.)

Litter (Section 1220, Vehicle and Traffic Law)—Prohibits persons from throwing refuse or garbage on any highway or within the limits of the rights-of-way.

Conservation Library

Part 8

Books on Fossils

Part 1 of the Conservation Library appeared in the February-March 1956 issue and dealt with the identification of animals. Part 2 in the April-May 1956 issue listed books on trees and shrubs. Part 3 in the June-July 1956 issue listed books on herbs (wild flowers) and grasses. Part 4 in the August-September 1956 issue listed books on fungi and aquatic plants. Part 5 in the December-January 1956-1957 issue listed books on lichens, ferns, and mosses. Part 6 in the February-March 1957 issue listed books on soils, rocks, and minerals. Part 7 in the December-January 1957-1958 issue listed books on oceanography.
The next installment will list books on conservation philosophy, ecology and management.

Reading guide: *Books are listed in the left-hand column and recommending authorities across the top. Stars indicate which specific books these authorities recommend. Accompanying digests show source and briefly outline contents of each book listed.*

	Fisher*	Dunbar*	Colbert*	Wells*
HANDBOOK OF PALEONTOLOGY FOR BEGINNERS AND AMATEURS PART 1 THE FOSSILS *W. Goldring*	★	★	★	★
INDEX FOSSILS OF NORTH AMERICA *H. W. Shimer and R. R. Shrock*	★		★	★
ELEMENTARY GUIDE TO THE FOSSILS & STRATA IN THE VICINITY OF CINCINNATI *Bucher, Caster and Jones*		★		
THE FOSSILS OF ILLINOIS *Carelton Condit*		★		
INVERTEBRATE FOSSILS *R. C. Moore, C. G. Lalicker and A. Fischer*	★		★	
ANCIENT PLANTS AND THE WORLD THEY LIVED IN *H. N. Andrews, Jr.*	★		★	
PALEONTOLOGY OF NEW YORK *James Hall*			★	
MAN AND THE VERTEBRATES *A. S. Romer*	★		★	
EVOLUTION OF THE VERTEBRATES *E. H. Colbert*	★		★	
LIFE OF THE PAST *George G. Simpson*	★		★	
TRIASSIC LIFE OF THE CONNECTICUT VALLEY *R. S. Lull*			★	
A GUIDE TO THE NATURE AND ENVIRONMENT OF FOSSIL VERTEBRATES OF N. Y. *R. L. Moodie*			★	
THE MASTADONS, MAMMOTHS AND OTHER PLEISTOCENE MAMMALS OF N. Y. STATE *C. A. Hartnagel and S. C. Bishop*	★		★	
HISTORICAL GEOLOGY *C. O. Dunbar*	★			
LIFE LONG AGO *G. L. Fenton*	★			
ANIMALS OF YESTERDAY *B. M. Parker*	★			
ANIMALS ON THE MARCH *W. M. Reed*	★			
THE MEANING OF EVOLUTION *G. G. Simpson*	★			
LIFE, AN INTRODUCTION TO BIOLOGY *G. G. Simpson, C. S. Pittenbrigh, L. H. Tiffany*	★			
AN INTRODUCTION TO PALEOBOTANY *C. A. Arnold*	★			
TEXTBOOK OF PALEOBOTANY *W. C. Darrah*	★			
INTRODUCTION TO MICROFOSSILS *D. J. Jones*	★			
INVERTEBRATE FOSSILS *R. C. Moore, C. G. Lalicker, A. G. Fischer*	★			
PRINCIPLES OF INVERTEBRATE PALEONTOLOGY *R. R. Schrock and W. H. Twenhofel*	★			
ALL ABOUT DINOSAURS *R. C. Andrews*	★			
THE DINOSAUR BOOK *E. H. Colbert*	★			
EVOLUTION OF THE VERTEBRATES *E. H. Colbert*	★			
DINOSAURS *E. H. Colbert*	★			
THE WORLD OF DINOSAURS *D. H. Dunkle*	★			
VERTEBRATE PALEONTOLOGY *A. S. Romer*	★			
A HISTORY OF LAND MAMMALS IN THE WESTERN HEMISPHERE *W. B. Scott*	★			
HORSES *G. G. Simpson*	★			

*DR. JOHN W. WELLS, Professor of Paleontology, Cornell University; DR. EDWIN H. COLBERT, Curator of Fossil Amphibians and Reptiles, American Museum of Natural History, N. Y. C.; DR. CARL O. DUNBAR, Professor of Paleontology and Director of Yale Museum, Yale University, New Haven, Conn.; DR. DONALD FISCHER, State Paleontologist, N. Y. S. Museum, Albany.

Books on Fossils

Handbook of Paleontology for Beginners and Amateurs by Winifred Goldring. Part 1: The Fossils (1950), New York State Museum Handbook 9. A non-technical book for the teenager or adult. General coverage of invertebrates and vertebrates with special attention to New York State. Illustrated with line drawings for the greater part. Bibliography extensive but largely outdated.

Index Fossils of North America (1944) by H. W. Shimer and R. R. Shrock; John Wiley & Sons, New York. Catalogue of most common and important invertebrate fossils of North America profusely illustrated by photographs. Short descriptions of species as well as concise discussion of morphology. A necessity for the serious amateur.

Elementary Guide to the Fossils and Strata in the Vicinity of Cincinnati (1945) by Bucher, Caster, and Jones; Cincinnati Museum of Natural Science. Good pictures of common upper Ordovician fossils.

The Fossils of Illinois (1957) by Carleton Condit; Illinois State Museum. Booklet written and illustrated for popular use. One of natural science series.

Invertebrate Fossils (1953) by R. C. Moore, C. G. Lalicker and A. Fischer; McGraw-Hill Book Company, New York. A complete discussion of invertebrate fossils, illustrated by drawings. A textbook for professionals and students.

Ancient Plants and the World They Lived In (1947) by H. N. Andrews, Jr.; Comstock Publishing Co., Ithaca, N. Y. Clearly written, well illustrated general account of fossil plants. Good photographs.

Paleontology of New York (1847-1892) by James Hall; New York State Geological Survey, Albany. Out of print, but obtainable in larger libraries. The largest and most complete description of New York State invertebrate fossils, well illustrated. Published in 8 large volumes with 3,752 pages, 802 plates. Because of out of date terminology, largely the basic reference for professionals and amateurs.

Man and the Vertebrates (1955) by Alfred Sherwood Romer; The University of Chicago Press, Chicago 37, Ill. 687 pp. Also published as A Pelican Book; two volumes (paper-back) by Penguin Books, 3300 Clipper Mill Road, Baltimore, Md. 1957. A good book for the lay reader on the evolution of vertebrates. It is slanted in the direction of human development, but the first part of the book is a brief overall survey of all of the backboned animals; photos and line drawings.

Evolution of the Vertebrates (1955) by Edwin H. Colbert; John Wiley & Sons, Inc. 440—4th Av., New York City 16, N. Y. 479 pp. A book intended for the lay reader, for senior high school students and for general college students. Technical terms are explained as fully as possible, and the text is written in as non-technical a manner as possible.

Life of the Past (1953) by George Gaylord Simpson; Yale University Press, New Haven 7, Conn. A simple exposition of life's history through the ages by one of the outstanding authorities on the evolution of fossil mammals. Clearly written and understandable to the layman. Line drawings by the author.

Triassic Life of the Connecticut Valley (1953) by Richard Swann Lull. Rev. Ed.; Bulletin of the State Geological Natural History Survey, Hartford. No. 21, 331 pp. Although this work deals with the Connecticut Valley, it treats an area that is closely contiguous to New York State. It describes the fossil vertebrates that lived during one geologic period in eastern North America.

A Guide to the Nature and Environment of the Fossil Vertebrates of New York (1933) by Roy L. Moodie; New York State Museum Handbook No. 12. 122 pp., illus. A specially written guide to the fossil vertebrates of New York.

The Mastodons, Mammoths and Other Pleistocene Mammals of New York State (1922) by C. A. Hartnagel and Sherman C. Bishop; Bulletin of the N. Y. State Museum, 241-242, pp. 100-110. An account of the Ice Age mammals that lived in New York State. Photos.

Historical Geology (1955) by C. O. Dunbar; John Wiley & Sons, New York. Beginning college text; good photos, chronologic history of fossils. Bibliography.

Life Long Ago (1937) by C. L. Fenton; Reynal & Hitchcock, New York. For ages 10 and up; illustrated with photos and drawings.

Animals of Yesterday (1941) by Bertha Morris Parker; Harpers, New York. Drawings. Ages 8-14. Recommended for the pre-High School student.

Animals on the March (1937) by W. Maxwell Reed and Jannette M. Lucas; Harcourt, Brace and Co., New York. Age 15 and up. Photos.

The Meaning of Evolution (1949) by G. G. Simpson; Yale Univ. Press, New Haven. Popular summary of the fossil record, evolutionary theory.

Life, an introduction to Biology (1957) by G. G. Simpson, C. S. Pittenbrigh, L. H. Tiffany; Harcourt, Brace & Co., New York. Comprehensive technical treatment of modern and fossil organisms, well illustrated with photos and drawings. Extensive bibliography.

An Introduction to Paleobotany (1947) by C. A. Arnold; McGraw-Hill, New York. College text; requires some knowledge of botany. Photos and drawings.

Textbook of Paleobotany (1939) by W. C. Darrah; D. Appleton-Century Co., New York. College text; paper cover, classification somewhat outdated. Drawings.

Introduction to Microfossils (1956) by D. J. Jones; Harper & Bros., New York. Describes the most practical methods of collecting, separating and mounting microfossils. Illustrated well with line drawings of major fossil animal and plant groups found as microfossils. Splendid glossary. Bibliography.

Invertebrate Fossils (1952) by R. C. Moore, C. G. Lalicker, and A. G. Fischer; McGraw-Hill, New York. College reference. Detailed descriptive text; line drawings, good for identification. Bibliography.

Principles of Invertebrate Paleontology (1953) by R. R. Shrock and W. H. Twenhofel; McGraw-Hill, New York. College reference. Detailed advanced text of invertebrate fossils, profusely illustrated. Line drawings and photos. Good for identification. Bibliography.

All About Dinosaurs (an allabout book) (1953) by R. C. Andrews; Random House, New York. Ages 9-18.

The Dinosaur Book (1951) by E. H. Colbert; 2nd Ed. McGraw-Hill, New York. Popular account of all kinds of fossil reptiles. Age 18 and up. Line drawings, paintings (black & white) and photos.

Evolution of the Vertebrates (1956) by E. H. Colbert. College text, line drawings. Extensive bibliography.

Dinosaurs (1957) by E. H. Colbert; Amer. Mus. Nat. Hist. Service Guide No. 70, New York. Age 14 and up. Good photos. Very readable.

The World of the Dinosaurs (1957) by David H. Dunkle; Smithsonian Institution, Washington, D. C. Age 14 and up. Excellent photos and drawings. Very readable.

Vertebrate Paleontology (1945) by A. S. Romer; 2nd ed. Univ. of Chicago Press, Chicago. Advanced text. Good for osteology. Illustrated by line drawings, extensive bibliography and table of vertebrate classification. Requires background of comparative anatomy.

A History of Land Mammals in the Western Hemisphere (1937) by W. B. Scott; Macmillan, New York. A technical detailed account of the lineages of fossil mammals. Requires introductory biology and paleontology. Excellent photos.

Horses (1951) by G. G. Simpson; Oxford Univ. Press, New York. Popular account of recent and fossil horses with emphasis on their evolution. Splendid photos.

LIMESTONE CREEK

(*Continued from page* 8)

ning of projects, such as the planting of 3,000 trees by the Boy Scouts of Fayetteville in April—a co-operative venture between the latter, the Fayetteville-Manlius Rod and Gun Club (see Ben O. Bradley, THE CONSERVATIONIST, Dec.-Jan., 1947-48) and the Watershed Association. They involve building and installing signs on highways at entrances to the watershed, preparation of portable bulletin boards and their circulation among banks, libraries and stores which display them. Included also are the getting out a *Watershed Newsletter* every two to three months, taking photography expeditions and other field trips, holding public meetings and sponsoring adult education courses.

In addition we co-operate with and help publicize the conservation work being carried on by other civic organizations, e.g., the League of Women Voters, the service clubs, the Federation of Sportsmen's Clubs, 4-H, Scouts and other youth groups, etc. We act also as a sort of "central clearing house" in assisting individuals and clubs to make contact with local and government agencies which give advice and technical help on matters relating to natural resources conservation. We are about to begin a series of "Kitchen Conferences" with our farmers in the upper part of the watershed, in an effort to learn how we may better assist them.

Limestone Watershed Association, Inc. is just a little over a year old. The tasks ahead far outweigh the few accomplishments to its credit to date. But we are convinced that our efforts are and will continue to bear fruit. By 1960 we expect to have a regular, sustaining income from members, representing every family and every organization in the area. This will be sufficient to support a part-time staff and a modest office (at present we meet fortnightly, in village halls, factories, offices, etc. on an alternating basis).

Experiences of other watershed associations have shown that the first five years are the hardest. After that results begin, slowly, to show. Ten to fifteen years of sustained efforts in improving and managing the natural resources base, effect a real transformation of once neglected, run-down landscapes. Statistics also show the results in better incomes and a more stable prosperity for everyone in the watershed community.

We in the Limestone Watershed Association believe that all our people want good land and water management, for its own sake as well as for the benefits it brings to everyone. We believe also that most of the work can be done with our own facilities, supplemented by help from municipal, county and State agencies. The long-range goal of complete watershed management will be years in achieving. We farmers, suburbanites, villagers, merchants and manufacturers of Limestone know this. We know also that this valley is our "little piece of earth." No one is going to take care of it for us. It is our job. It is possible, challenging and immeasurably worthwhile.

What's in a name?

According to Homer Circle, Chairman of Committee on Fish Names, Outdoor Writers' Association of America, much confusion is possible with respect to common names of several salt-water fishes.

For example, the fish most commonly known as the bluefish has also been called snap mackerel, skipjack, fatback, snapping mackerel, tailor, snapper, horse mackerel, greenfish, and skip mackerel. Channel bass may travel under such monikers as red drum, redfish, pescado colorado, bull redfish, bass, red bass, sea bass and spotted bass. While the thresher shark is sometimes referred to as fox shark, swingletail, longtail shark, fish shark, sea fox, sea ape, pez zorro and pesca pavone.

the back of the book

What recession?

There's one segment of U. S. business (boats and such) that keeps merrily perking along and expanding as fast as it can—in contrast to many others yelling about an economic slump, unemployment, tight money and lousy business conditions.

Strangely enough, this industry has been tabbed "luxury"—an ominous label carrying the implication of sudden demise when things "get rough."

A West Coast manufactory of quality fibreglass boats is one example. They have tripled facilities in the face of slack ticker tape and are adding new plants. They expect a 200 per cent increase in the next 18 months.

The outboard motor industry is another example of sunshine on a gloomy day. Exhibiting a healthy business increase for the past several years, its sales spurt upward where unemployment occurs. Detroit outboard dealers note that their business booms whenever auto workers go on strike.

A manufacturer of expensive fishing tackle reports things are rosy, too. He expects a 160 per cent increase in business and states that most of the rush is for his firm's higher-priced merchandise.

These examples indicate that people can still afford to pay for play, and perhaps this attitude may be the cure for our economic ills—if we really have any.

Conservation teaching materials

Emphasis on teaching conservation and resource-use in the schools is increasing—and fortunately so. Every year our population enlarges and the need becomes greater.

The National Association of Biology Teachers has prepared a 55-page bulletin listing free and inexpensive materials from state and national agencies, selected references, films and film strips prepared by the Conservation Committee of N.A.B.T. It is available from Interstate Printers and Publishers, Inc., Danville, Ill. for 35 cents.

The new materials listed in this bulletin were assembled as the appendix of the *Handbook for Teaching Conservation and Resource-Use*. The latter is also available from Interstate Printers and Publishers, Danville, Ill., $4.50—with educational discounts available to schools and teachers.

The Association is certainly to be commended for these much needed references.

Water pollution

A permanent injunction against the Anjopa Paper Manufacturing Company, Inc. at Napanoch, Ulster County has been obtained by the State Water Pollution Control Board. It is the first to be obtained by the Board for violations of statutes prohibiting pollution of waters in the State.

The order, which permanently enjoined Anjopa from operating its plant "in contravention of lawful orders of the New York State Water Pollution Control Board," was signed by State Supreme Court Justice Donald S. Taylor. The plant has not been operating for several months.

The Anjopa plant had been discharging paper manufacturing waste and sewage, without treatment, into Rondout Creek in the Wallkill River Drainage Basin.

This legal step was taken against the Company after all efforts (begun in 1953) failed to obtain correction through co-operative action.

It is most encouraging to know that the Water Pollution Control Board has "teeth" and can use them when it has to.

Christmas tree bonus

During the 1957 season 56,858 Christmas trees were harvested from reforestation areas administered by the Conservation Department. In addition to improving the remaining stand for both forestry and wildlife, the sale of these trees—on the stump to wholesalers after competitive bidding—netted the sum of $58,454.70, or a little better than a dollar per tree on the average.

Not a bad return for a few cents investment per tree planted on land not suitable for much of anything else. Many private landowners have followed the lead and are converting their idle acres to producing trees. Forest tree plantations are not "get rich quick" gimmicks. On the contrary, they are long term investments, but properly planned, they can be a good investment for the future with the first financial return from the sale of Christmas trees within seven to ten years after planting.

This year, as in the past, Scotch pine was a popular species at Christmas time, accounting for 86 per cent of the total sold from State areas. In heavy demand in western New York, this tree is gradually invading eastern New York markets and sooner or later, if the present trend continues, can be expected to become a strong bidder for the balsam trade.

Two recent developments marked the 1957 Christmas tree season. U. S. grades have been established for the trade and, in the future, both producers and buyers can be expected to be more quality conscious. This should reduce the number of culls and poor quality trees reaching the market. Of late, pruned trees have made their appearance commanding top prices, but apparently some producers have been overdoing it. Dense trees that have been too well pruned do not allow room for decoration.

Landowners contemplating the establishment of forest tree plantations for any purpose are urged to get in touch with the District Foresters in their area of the State.—Roy Irving

The greedy pike

Bill Taubman of Ithaca sent in the accompanying photograph of two pike found at the mouth of Taughannock Creek (Cayuga Lake State Park). Taubman reports that when found, the fish were still struggling but the situation was quite impossible and they succumbed.

Of all game fish, members of the pike family have the reputation of being the most predaceous. Here's a good indication of how they earned the name.

Fortune from the sea

Few people realize when they go to the store or supermarket to buy fish, fresh or frozen, how much New York's marine waters contribute to the amount and variety they can buy. New York State has a relatively short coastline, being made up primarily of the Long Island coast. Nevertheless, the commercial landings of shellfish and fin fish compare favorably with or better than many States having considerably longer coastlines.

During 1957, New York landings of fish and shellfish, exclusive of menhaden taken by purse seines, amounted to 157 million pounds, with value of $8.5 million. Scup or porgy led the catch with 11.8 million pounds; whiting was in second place with 3.7 million pounds, then fluke with 3.5 million pounds. Hard clams held first place in the shellfish division with 3.6 million pounds. These four species accounted for 57 per cent of New York's total edible fish landings.

Theodore Roosevelt—Conservationist

The month of June has been commemorated to "Teddy" Roosevelt and his important contributions to conservation and resource management. This will be a part of the year-long celebration of the 100th anniversary of "the man of actions'" birth.

Theodore Roosevelt, as a youth, gained much of his interest in nature and the out-of-doors in our own Adirondack Mountains. He came to be Governor of New York and later President of the United States. In fact, he became President somewhere on the Newcomb-Minerva road in the Adirondacks when, in 1901, on the death of President McKinley, he sought to reach a special train waiting for him at North Creek.

Roosevelt's accomplishments in natural resource management are legion and many were the forerunners of important continuing conservation programs. He was a student of biological science and wrote well on its teaching and applications. As a statesman he effectively consolidated and reorganized government work in forestry with the calling of the first National Forestry Congress in 1905. In 1908 he called the Conference of Governors which dramatized conservation as a national policy. During his term of office over 100 million acres of lands became National Forests. Considerably influenced by his thinking, 18 colleges and universities were offering professional training in forestry by 1910.

The hunting of large and dangerous game was a challenge to "Teddy" and his exploits were widely publicized. Many of his trophies became permanent museum study groups. These exploits no doubt influenced a real concern on his part to perpetuate rather than exploit wildlife resources. It was during the early years of his administration that the first Federal wildlife refuge was established at Pelican Island in Florida. In 1904 alone, he established by executive order 51 national bird preserves in 17 States and territories including Alaska, Hawaii and Puerto Rico. Other wildlife preserves and sanctuaries were established throughout his administration.

Although the national parks and monuments movement began considerably before Roosevelt's administration, it was his energetic impetus that brought about the National Monument Act in 1906, providing for the establishment of such monuments by presidential proclamation. Once this law became effective he set about establishing a great variety of areas involving unique natural environment. More than 85 of these sites, aggregating in excess of 9 million acres, were set up under the system which is now a part of our national parks.

During the Roosevelt administration initial pioneering took place in soil and water conservation and his signing of the Reclamation Act in 1902 marked the real beginning of public appreciation of the needs of an expanding population. Progress since then has been substantial but much remains to be done.

The present generation owes Theodore Roosevelt a debt of gratitude for his farsightedness and "man of action" approach to the many problems that affect and establish the high standard of living in this country.

Kings 'n things

Heard on local radio (WROW) program:

"Once upon a time, many years ago, there was a king who abhored the killing of animals. He issued a royal decree prohibiting the destruction of animal life by any means. Soon thereafter the land was overrun by beasts of all sorts, whereupon the starving peasants arose and overthrew the king.

"This is perhaps the only recorded instance of the reign being called because of the game."

Porcupine diet

A study of bobcat diets in Minnesota showed porcupine flesh was the third most numerous food and was present in 10 out of 50 stomachs. In Yellowstone Park, before predators were protected, 75 per cent of the coyotes killed carried porcupine quills.

Robert G. Ohlman

"Bob" Ohlman was well known and respected by sportsmen and conservationists in Southeastern New York as District Game Manager of that area for nearly ten years. It was a shock to them, and to his colleagues in the Conservation Department, to learn of his untimely death on April 14.

"Bob" had a wealth of experience in resource conservation from long and varied experience in this field. It will be difficult to replace his excellent capabilities in handling the wildlife management problems of this area and his ability to meet and deal with the public on the many and varied problems.

"Bob" was a graduate of the College of Forestry at Syracuse and received degrees in Forestry from the University of Michigan where he also served as associate professor of forestry and wildlife management. He enlisted in the Army shortly after the outbreak of World War II and served with the Corps of Engineers in Arctic survival training. After his discharge from service with the rank of lieutenant he joined the Fish and Wildlife service to work with the river basin studies until he was appointed District Game Manager for the Lower Hudson District in 1948.

Ohlman was a member of several professional societies including the Society of American Foresters, the Wildlife Society and the Society of Mammalogists. In his home area "Bob" was active in various capacities with civic groups including the Boy and Girl Scout councils, the Dutchess County Federation of Fish and Game Clubs, LaGrange Fire Company and others.

"Bob" was a native of Poughkeepsie as are his wife, Betty, and their two youngsters, Robert, 10, and Suzanne, nine.

Coy-dog

"Wildlife Enemy No. 1—Who, Me?"

In the Town of Dickinson, Franklin County, six coyote pups were observed feeding near the town dump. The pup's mother was seen at a distance and appeared to be a purebred coyote. Five of the pups were shot and the sixth taken alive. This was in March and the pups were estimated to be about 8 weeks old, weighing in at approximately 7 pounds each. The litter must have had a January birthday — a pretty rugged month to start life in the Adirondacks.

The captured pup was brought to the Department's Delmar Wildlife Center to be raised to see what it looks like at maturity. The pup has dew claws on its hind feet indicating some domestic dog ancestry and probably accounts for the unusual birth date. In the West, coyote litters are usually whelped in April and May and the same has applied generally to the Adirondack variety.

Keep green

By official proclamation of Governor Harriman, New York observed its first "Keep New York Green" week in April.

This special week was arranged as a part of the continuing program for forest fire prevention by the Empire State Forest Products Association, an organization of pulp and paper manufacturers, lumber companies and other timber-growing landowners in the State. The observance included exhibits, talks before service clubs, use of radio and television, advertising and press releases to impress the public that keeping New York green benefits everybody, the year 'round.

New York's forests provide raw materials for more than 125,000 employees in forest products industries whose wages alone exceed $500 million annually. The products they manufacture provide incalculable worth to our economy and standard of living. Even more important, the green forests conserve our dwindling water supplies, prevent soil erosion, build good top soil, provide food and shelter for wildlife and offer unequalled opportunities for healthful outdoor recreation.

Forest fires are a serious threat to the State's woodlands and the majority of them are caused by human carelessness. The Governor said in his proclamation that "it is the duty of each of us to accept the fullest personal responsibility for protecting our forests against the ravages of fire and everyone should keep fire prevention rules constantly in mind to effectively help in keeping our Empire State beautiful and green."

For a review of how the Conservation Department handles its huge responsibility in this field, see Governor Harriman's article, "Forest Fire Control," in this issue of THE CONSERVATIONIST.

More muskys

There's some new, big and baleful eyes peering out from the weedbeds in two small, central New York lakes this Spring. Just how many eyes is not certain but fisheries biologists know whose eyes they are—MUSKYS'. Now they are waiting for fishermen to write the next chapter.

Back in 1954 Waneta and Lamoka lakes in Schuyler County were stocked with muskalonge fry. Each year since then additional stocking has been made of fry and fingerlings up to 9" in length.

During April of this year fisheries biologists set a trapnet at the south end of Waneta Lake and it produced two muskalonge. Both fish were 27" long and by scale examination determined to be four years old, or the result of fry stocked in 1954.

The later plantings of fingerlings have been marked by the removal of a single fin and some of these fish may reach the legal length of 24" this year.

Muskalonge fishing in New York has been pretty well restricted to the St. Lawrence River and some adjaent waters. Chautauqua and Findley lakes in southwestern New York and Conewango Creek, with some in the Allegany River and several of its tributaries.

It will be interesting to watch the progress of the new fishery at Waneta and Lamoka.—U. B. STONE, *District Fisheries Manager*

Chipmunks

A single chipmunk has been observed cramming 13 prune pits into its cheek pouches. No wonder they look as though they have the mumps come the Fall storage season.

Better conservation teaching

The Conservation Education Association will hold its Fifth Annual Conference at the University of Utah, Salt Lake City on August 18 to 21.

The conference theme, "Conservation Education at the Grass Roots—How can We Do It Better," pretty well explains the objectives. Participants will include educators from all teaching and administrative levels, leaders of youth groups, and representatives of industries and public and private agencies concerned with wise use of natural resources.

A varied program has been planned and the group will analyze conservation teaching techniques and tools including teachers' and sportsmen's workshops, publications, field trips, charts, posters, films, slides and other methods of instruction with an eye toward improving and adding to them.

With the tremendous increase in out-of-door living and recreation across the Nation and heavier demands on all natural resources to maintain our high standard of living—such a conference can only mean progress.

The Salt Lake City setting offers much too, in the way of field trips and sight seeing for those who can take an extra day or so. Only a day's drive away are Bryce, Zion, Grand Canyon and Yellowstone and Dinosaur parks and monuments.

The meeting is open to the public.

Old acquaintance renewed

Tom Walker, Foreman of the Lake George Fish Hatchery, reports shaking fins with two old friends during lake trout spawn-taking operations at Raquette Lake last Fall.

A lake trout, originally netted and tagged in October, 1952, and again netted in 1956, then reappeared for the third time in October, 1957. Aged in 1952 as 11 Winters old, this male fiish is now 16 Winters old. Actual weight in 1952 was 3 pounds and estimated weight in 1956 was 4 pounds, which is typical growth for lakers in Raquette.

Another teen-age lake trout also wandered into the nets. This laker had not been recorded seen since May, 1942, when it was planted in Raquette Lake as a fin-clipped yearling. Age also would be 16 Winters.

In contrast to the growth rate of our three-time handshaking extrovert, weighing between 3-4 pounds at 16 Winters, is an 18-Winter (or more) lake trout taken by an angler in the Spring of 1957 in Raquette Lake. That one weighed 22 pounds.—R. G. ZILLIOX, *District Fisheries Manager*

Forest fire conference

The tenth training session of the Northeastern Forest Fire Protection Commission was held early this year in Concord, N. H.

There were a total of 88 persons present besides the trainees, training team and Commissioners, observers from the fire control organizations of Ontario and Quebec, Canada; New Jersey; Pennsylvania; Washington and the Regional Offices of the U. S. Forest Service; Michigan; Southeastern Forest Experiment Station; White and Green Mountain National Forests; U. S. Weather Bureau; Civilian Defense and other interested agencies.

The subjects presented were: Recognizing the Potential Severe or Extreme Fire Condition; Air Attack on Forest Fires; Possibilities of Mechanization in Forest Fire Control; Conference Type of Demonstration; Practical Application of Forest Fire Prevention; New Hampshire Group Problem Solving of Forest Fire Suppression Methods and Techniques; Clarifying Some Items of Message Center Operation; Co-ordination of Forest Fire Control Agencies.

Part of the session was devoted to the application of the Compact Fire Organization by the States of Maine, Massachusetts and New York during the 1957 Spring, Summer and Fall fire season, by representatives from each state, and each state's Forest Fire Organizational Structure in the Compact was explained by means of diagrams and charts.

Another feature of the meeting was the so-called Gadget Hour during which new materials and equipment found practical and useful in fire control work in any one state were exhibited to show their possible application and use in the other Compact states. Massachusetts demonstrated a new hose carrying rack; Maine a shelter for the storage of fire and camping permits in remote areas; and New York showed its new Rur-A-Line used in new telephone line construction and the F. W. Dwyer wind meter.

Mourning doves

Often called a "neglected resource," mourning doves are exceeded in popularity among southeastern sportsmen only by bobwhite quail. Dove hunting is permitted in more than half of the United States, and reports of hunter-take during the 1956 season showed that the bag exceeded 19 million birds—about one third more than the combined reported kill in the U. S. of ducks, geese, and other migratory waterfowl.

A report entitled, "Mourning Dove Investigations," published by the Southeastern Association of Game and Fish Commissioners presents the research findings and management implications of a co-ordinated study by biologists of the ten states, U. S. Fish and Wildlife Service and the Wildlife Management Institute.

The report summarizes all data collected during the nine years study and reflects the interest of wildlife agencies and sportsmen in this important wildlife resource.

New York game men have co-operated in the study with regard to breeding ground information. There is, however, no open hunting season for this species in this State.

Trees in circles

Foresters of a Wisconsin paper company have found there is much less damage from browsing deer to newly-planted trees if they are set out in circular patterns rather than straight rows. Deer have a tendency to saunter down a straight row nipping tender buds and twigs from tree after tree, but seem to regard a circular pattern as too much trouble.

Vacationlands—1958

"The grass always looks greener on the other side of the fence," but before you plan your vacation in "faraway places" take a quick look at what our own State has to offer. We'll bet you've been aware of only a small part of its open-road enticements.

How do you take this quick look? Easy. Send for the New York State Department of Commerce booklet VACATIONLANDS—1958 edition. This colorful and informative guide to the Empire State will put you on course.

Just riffling through VACATIONLANDS' 192 pages—many in full color—will give you an armchair "Cook's tour" of New York. And don't forget to tuck VACATIONLANDS into the glove compartment of your car when you start out. It's better than a paid guide.

For your free copy, write to New York State Department of Commerce, 112 State Street, Albany 7, New York.

Honeybees

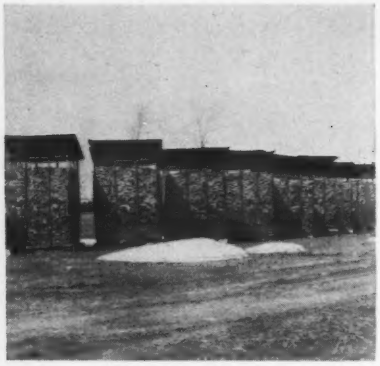
(*Continued from page* 29)

in colony productiveness because of the attention he can lavish on his winged pets.

In addition to having to be alert for disease the operator may be plagued by bears, skunks and opossum. The bear is the most devastating destroyer and unless counter measures are taken, a bear—with his famous "sweet tooth"—can put an apiary out of business. In the mountain areas—the Adirondacks and Catskills—they can be a serious nuisance, and occasionally in the Southern Tier they become bothersome, too. Erection of an electric fence around the bee yard may serve as an effective deterrent. Occasionally, though, it may be necessary to use stronger medicine—a gun, under permit from the Conservation Department, or to call in one of the Department's wildlife damage control men. Skunks, as insect eaters, are the most widespread serious predators and through their scratching at the hive entrance can destroy large numbers of bees as they rush out at night to defend their stores. In addition to weakening the colony seriously if not controlled, they keep a hive in an uproar. The opossum, as it has increased in numbers in recent years, has become a nuisance problem in apiaries. Furtunately, both skunks and opossum are easy to trap, and while the skunk is a protected species under the Fish and Game Law, no permit is needed for its destruction when it is injuring property or has become a nuisance. The opossum is not protected under the law.

Only a few highlights concerning the fascinating history and life story of the bee have been touched on here. Cornell University has a large library on the bee; in fact the largest to be found anywhere, and those who are really interested can consult references there and in other libraries. Cornell Bulletin E833 entitled, *Beekeeping*, by E. J. Dyce, is available by writing to the Mailing Room, Department of Extension Teaching and Information, N. Y. S. College of Agriculture, Ithaca. A copy of New York's law governing beekeeping can be obtained by writing to A. C. Gould, Apiculturist, Department of Agriculture and Markets, Albany.

It is to be hoped that New York can continue to be the leading honey producing state in the Northeast. Fortunately, spraying by the Department to control the gypsy moth and other insects which are injurious have not jeopardized beekeeping in the State. It is certain that anyone interested in conservation should be interested in and concerned with the welfare of the State's bees.



Corn fed deer

Food was a critical item for deer during this past Winter of deep snows but a herd in the vicinity of Ithaca found a partial solution.

On the Ithaca-Dryden road the Cornell Agricultural College has a series of corn cribs set up for the storage of ear corn. The corn is enclosed with wire mesh 2″ x 4″.

In a single evening during March, as many as 100 deer could be observed around the corn cribs, nibbling at the corn through the wire mesh, as high as they could reach.

Venom

The story goes that, before Queen Cleopatra of ancient Egypt took her life with the bite of an asp, she tested its deadliness on her slaves. Many primitive peoples used the venom from snakes to poison their arrows. In fact, until the 17th Century, there was more exact knowledge concerning poisons, especially snake venom, than of medicinal drugs. Their results were more certain and immediate. Modern pharmacology, the study of the action of drugs, grew out of this early lore about poisons.

Venomous snakes are native to every continent but are scarcer in temperate zones than in tropical countries. Their venom aids in the capture of small animals for food and helps defend them against large animals and man. Of about 40,000 human deaths from snake bite in the world each year, over half are among the crowded populations of India where it is customary to go barefoot. Brazil formerly had 5,000 deaths annually. In the United States, rough estimates from incomplete reports indicate that several hundred people are bitten each year, of which about one in ten may die—chiefly from rattlesnake bites in the southern and southwestern states.

The poisonous snakes of the United States include the coral snake, the cottonmouth moccasin, the copperhead, and about 20 kinds of rattlesnakes. The coral snakes, small relatives of the cobra, are found in small numbers in our southeastern states. All of the others are "pit vipers," so-called because of a pit on each side of the head between the eye and the nostril.

Venom is a clear, pale yellow fluid secreted by glands connected with a pair of hollow fangs hinged to the upper jaw. When the snake strikes, the fangs are swung forward from the roof of the mouth and the poison is injected into the punctures as if by hypodermic needles. Venom is a complex of protein-like substances which, from different species, has various effects. There are two main kinds —the cobra-type affects the nervous system causing paralysis and the rattlesnake-type destroys the red blood cells.

The bite of a poisonous snake is a serious matter although not as dangerous as many people suppose. The aid of a doctor should be secured as quickly as possible.

A few other animals with backbones are known to inject poisonous substances into punctures made by teeth or spines. There are several examples among fish. In the sea, the sting ray can drive the toothed spine on its tail into your flesh and produce excruciating pain. Others like our little fresh-water stone catfish have poisonous spines in their fins that can cause an aching hand and arm.

Two venomous lizards are known in the New World, the gila monster of our southwestern deserts and its near relative, the Mexican "escorpion." Among mammals, our tiny short-tailed shrew uses venom for subduing prey, and, on the other side of the world, the male of the Australian duck-billed platypus has poisonous spurs on his heels.

In an entire lifetime here there is less danger from poisonous snakes than in crossing one of our busy boulevards just once.—From *Nature Bulletin,* Forest Preserve District, Cook County, Ill.

Fish and the H-bomb

The Office of Defense Mobilization has listed fish as one of the six major groups of foods classified as "essential survival" items that would be needed to sustain life after a nuclear attack on the U. S. ODM announced that the list is being used as a basis for supply-requirement studies, and that it may recommend governmental stocking of these items in strategic and protected locations. The agency emphasized that many of the items might not be required in the first few days following an attack but would be necessary during the first few months.

It might not be a bad idea to keep a fishing rod handy, too.

Seneca deer

A concerted effort was made this past Fall to harvest the surplus deer at the 12,000-acre Seneca Ordnance Depot in central New York to combat an extreme starvation situation (see "Seneca Ordnance Deer—Part II" Feb.-Mar., 1958). The results were encouraging, with a hunting harvest of 881 deer.

An aerial survey of the area in February showed that, despite this harvest, the problem is far from solved. The observers counted 769 live deer and 13 dead ones. It was not possible to secure a complete count because many deer were known to be standing or lying in or near dense cover and this could not be observed. In some areas no deer was seen, but tracks and trails indicated there were animals in the area. Observers estimated that from 200 to 400 deer were missed in the count.

If this is the case, upwards of a thousand deer remain on the over-browsed area, and, the fawns expected to be produced this Summer will surely necessitate additional efforts toward harvest this coming Fall.

The bobcat

We've all heard any number of stories about animals and children, but my favorite is the one about the little boy who was walking through the woods one day and saw what seemed to be a pussy cat. The youngster decided to bring the animal home with him and although the kitty was strangely unwilling to come along, the child finally managed to grab him by the neck and carry him.

Once inside the house, the little boy put the cat down on the floor. But instead of purring his gratitude, the animal ran under a bed and stayed there for the rest of the day, glaring and spitting ferociously if anyone came too near. When Daddy came home, the family learned why—the pussy was actually a young bobcat!

We have plenty of bobcats right here in New York State. They're not in just the Adirondacks or Catskills, either, but near populated areas of the Hudson Valley and Southern Tier.

Outside of a game farm or a zoo, most people never get the chance to see a live bobcat—and perhaps they're just as well pleased! For one thing, these critters like to pussyfoot around at night, when most of us are sleeping and they stick pretty closely to the heavily-wooded sections of the State. But even if you had a bobcat living next door, you'd probably never see it, day or night, because these animals are so stealthy and secretive.

The bobcat does look like a big cat, but he has a bobtail, tufts on his ears, and heavy whiskers that look like jowls. An adult bobcat is about a yard long, and may weigh as much as 40 pounds. The average weight, though, is 20 pounds which is still a lot more than the average pussy cat weighs!

The bobcat's coat is a light or reddish brown, streaked with black. Because of this protective coloring, he blends right in with his background in the woods, making it very hard to see him. This makes it nice for the bobcat, but a little rough on the animals on which he preys. He can clobber them before they even know he's there! He preys on rabbits, chipmunks, squirrels, mice, rats or birds and their eggs. If a kill is too big to eat all at once, he'll hide it underneath some leaves or other debris and then come back later.

Like any true member of the cat family, the bobcat will spit, hiss, growl, purr and meow. At night, his loud caterwauling can be heard for a good mile—and it's such an unearthly sound, it can scare you out of six years' growth.

The bobcat looks ferocious, and he is, but where man is concerned, the animal is harmless and will not attack unless provoked.

Because the bobcat has such a nasty disposition—and because he kills and eats other birds and animals, there are some people who would just as soon that he and his kind packed their bags and went to Siberia. But if our wildcats did that, they might be doing the Soviets a favor. The bobcat and other predators help to keep in check many of our small animals, such as rabbits and mice, that might otherwise overrun the countryside and literally eat us out of house and home. That's why some ranchers out West will not allow bobcats to be killed on their land. They're afraid the mice and rats would be given a free hand.

Last of all, the bobcat has an aesthetic value for those lucky enough to have seen one in the wild. For as the famous naturalist, Mr. Seton, once wrote, "The bobcat is about as active and sinewy as anything on four feet . . . I consider him one of our handsomest, cleanest and most intelligent animals." — ROSEMARY CLARKE, *Radio Bureau, N. Y. S. Dept. Commerce.*

Trout or char

The brook trout is technically a char and differs from the true trout in the form of the vomer, a bone in the roof of the mouth which is somewhat boat-shaped, with teeth only at the elevated front end.

National forest game

Estimates are made periodically by the U. S. Forest Service of big game populations on National Forests. The latest estimate, as of April, 1957, showed a big game population of about 3½ million animals. Most abundant were deer—estimated at some 3,030,000. Next came elk, 263,000; then 104,600 bear; 25,000 antelope; 25,000 mountain goats; 18,000 peccary; 13,000 moose; 11,000 big horn sheep and 1,900 wild boar.

The harvest by hunters from this population accounted for 540,000 animals or about 15 per cent of the total population. Hunters took 477,000 deer (16 per cent), 49,000 elk (19 per cent), 8,360 bear (8 per cent), 2,400 antelope (10 per cent), 630 mountain goats (3 per cent), 1,500 peccary (12 per cent), 1,100 moose (8 per cent), 170 big horn sheep (2 per cent) and 150 boar (8 per cent).

Elk seem to be the easiest taken or are the most sought after while big horn sheep are the most difficult or least desired, although the rough terrain the sheep inhabit is bound to keep the kill low.

Mobile field units

The Bureau of Game has gone modern and acquired two rolling field units, incorporating living quarters and laboratory facilities for a variety of survey work. For years field surveys in the more remote sections of the State were conducted from the back of pickup trucks, jeeps, tent camps or from rented accommodations, the latter coming at fancy prices during the tourist season and seldom strategically located.

These two especially designed trailers will be used for the first time this Summer in the Adirondack area to serve as living quarters and laboratory for field work on deer and bear. Each unit is 17½ feet long, equipped to operate on location from bottled gas or electricity (heat, light, cooking) and with refrigeration for food and laboratory specimens. Sleeping quarters are especially designed for as many as five men.

The units are hauled quickly and easily to new sites by suburban, jeep or pickup truck, which adds additional space for storage of equipment.

Fluke

(*Continued from page* 21)

success and to offset the one year's waiting period? Certainly fewer numbers of this particular group would be caught in the year following, since a small per cent would die due to natural factors. But what of the harvest in terms of increased enjoyment of landing larger fish? And what of the relative poundage available for harvest? Perhaps the natural mortality would reduce a year class to less total weight the succeeding year than could be harvested by an intense fishery upon the smaller-sized fish when they first become available. Also to be considered is the effect of the abundance of the spawning population upon the production of young.

These questions cannot be answered with any degree of intelligence now, but as more data accumulate and are analyzed each year, the answers are hoped for and are, in fact, the goals of this investigation as well as of many investigations concerned with the intelligent use of our renewable resources.

Participation sports

According to the Athletic Institute, (Chicago), the U.S. Internal Revenue Department collected $317,000,000 in excise taxes on sports and recreation pastimes in fiscal 1957. The total take reflected big gains from participation sports.

Taxes from sporting events, concerts and theatres dropped 27 per cent in 1957. "Americans," the Institute points out, "are definitely cutting down on passive, spectator sports and spending more of their money on active sports participation."

Dyed ducks

During the past several months, personnel of the Florida Game and Fresh Water Fish Commission have been engaged in banding and dyeing ducks at Titusville on the central east coast of Florida. All species have been banded but only scaup have been color dyed. One color only, a bright red, has been used.

They are anxious to receive information on all observations of these birds and will appreciate being notified of the location, date, species, number, and color of any sight records or recoveries.

If you observe or recover any of these birds, notify Don Foley at the Wildlife Research Laboratory, Delmar, N. Y., and he will transmit the information to proper authorities in Florida.

Letters to The Editor

Sumac control

Dear Editor: I have some acreage in Dutchess County and have built a Summer home. For the past few years we are being overpowered with sumac.

I have tried cutting it to the ground but it seems to sprout up twice as heavy. I hesitated using poisonous spray because our spring is located on a slope below and was fearful of contaminating the water.

I also would like some information on clearing out birch growing in clusters as they are also over-powering us.

Frederick P. Noschese, Yonkers

• *Your problem is one quite common to Summer residences or in fact, any open land that is not periodically mowed or cultivated. The brush moves in and, if one is not waging a constant war, it will take over and dispossess the most resolute owner.*

As you and many like you have discovered, cutting sumac, one of the worst offenders, is not a solution in itself. However, if the individual stems are up to 4" or more in diameter, cutting can be an option for the first phase of an all-out attack. This would include the use of chemicals, the so-called "brush killers," some time after cutting as a foliage spray on the sprouts and smaller sumac during the next few growing seasons. Persistence equal in vigor to that of sumac itself, is one of the necessary ingredients to a successful program of eradication.

Now let's get specific. The brush-killer I mentioned is non-poisonous, so contamination of your spring would not be a factor, where used as directed. However, direct run-off of the solution into the spring or spraying over the water would cause some change in palatability. This would not occur, however, in normal application when precaution is taken near the spring. This chemical referred to is a combination of 2-4-D, the grass killer and 2, 4, 5-T a stronger concoction used for woody plants. This may be purchased at most seed and feed stores and usually is packaged as 4 lb. acid-equivalent per gallon and is priced at about $9.

Follow the manufacturer's directions for preparing a foliage spray (an emulsion oil, water, and chemical) and apply freely to all foliage and stems of brush head high or lower the first growing season after cutting the larger stems, preferably in July or August. This should be followed up with one or two more applications to kill the persistent sprouts in the next few years. As an added refinement at the time of cutting, a mixture of the chemical in fuel or diesel oil as per instructions for "basal spray," can be applied to the cut stumps, soaking them to the ground line and below. This will minimize sprouting from the stump and the root collar. Should you prefer, the basal spray can be applied to the larger stems in lieu of cutting, to be followed by several foliage sprays on the smaller brush as above. The use to which the land is put will influence the method used.

Birch clumps can also be killed by the application of a basal spray and here sprouting is not as profuse or vigorous as sumac. The spray can be applied at any time of the year, but Summer applications appear to be more effective for rapid kill.

One note of caution, be careful to make application only on relatively calm days as the drift of the spray will kill or deform flowers or garden crops at distances as great as 200 feet. Also, the spray residue in the tank will affect plants if it is used later for insecticides. Thorough cleaning is difficult. For that reason, it is best to devote one spray outfit to brush killing and keep it just for that purpose.—E. H. Huber, Supervising Forester

Battling bunnies

Dear Sir: Rabbits, I know, are supposed to be timorous creatures, but here's one observation that, for me, shed a new light on their character. About 10:30 A.M. a few days ago there was a terrific squealing in the yard. I looked out the window and saw two baby rabbits fighting. They had a hold of each other and were tossing and beating each other around. The mother was beside herself trying to get them apart. She was hopping wildly over them and around them trying to get them separated. Once, when she got them apart and started to hustle one off into the bushes one went right around her and the young ones started fighting and squealing again. They threw each other around for a distance of 20 to 25 feet. The mother finally got them separated and she and one of the bunnies hopped into the brush.

When I ran out to look, just one baby rabbit was lying there. He was panting and blinking and his ear moved a couple of times. He was about 10" long and he had a cut (bleeding) of about 1½", slanting from his shoulder up on to his neck.

By the time I had taken a good look he appeared to be dead. He had stopped moving. When I put my hand under him he was perfectly limp. We left him and about 15 or 20 minutes later he was still there. I went out again about 15 minutes after that and this time he was gone.

Sylvia Brown, Altamont

Bird lover

Dear Sirs: I'm a girl of 11 years old, and I'm starting a hobby of bird watching. I have a bird handbook but it tells me hardly anything. If it wouldn't be too much bother, would you please send me free material and a price list of bird books. Ever since I was a little girl, I used to go out into the fields and woods to hear and see the birds. Now that I'm older, I go out into the country and listen and look at the birds.

Once I was out in the country and a boy I knew had just killed a bluejay and he brought it up to me and showed it to me. And I slapped him across the face good and I gave him a good talking to. Since then he's never killed a bird. Thank you so much for listening.

Bird Lover, Judy Huffer,
Fort Edward

P.S.: Oh, how I love birds!

• *So we see—and good bird-watching to you, Judy.—Editor*

Yesterday and today

Dear Sir: Enclosed find a print of a picture I took somewhere in the Adirondacks over 30 years ago. Taken on a glass plate (8x10).

Frank R. Rix, Ilion

• *The message never grows old.*—Editor.

New lure

Dear Sir: While fishing at dusk for muskies in Lake Chautauqua, near Jamestown, an unusual experience happened to me.

I was trolling from an aluminum canoe with a small outboard close to shore in about ten feet of water. On the bow of my canoe I had a detachable red navigation light.

Quite unexpectedly a smallmouth bass 20" in length and weighing 4 pounds, 6 ounces jumped into my canoe. He appeared to have jumped at the small red light which was visible from the water.

I would appreciate any comments you may have as it was the easiest catch I ever had.

Chester A. Wagner, Jr.,
Wayne, Michigan

• *I believe the first conclusion to be drawn from your letter of October 10 and the experience it describes is that you were just plain lucky. Occasional instances of fish jumping into boats or onto the banks of streams are on record. Bass occasionally jump for no apparent reason at dusk and perhaps especially during rain storms. Apparently, also, fish jump when startled by boats but rarely end up in the boat.*

There is no definite evidence to show that lights on boats prompt such jumping although that seems possible. I know of only one instance when a fish jumped into a boat at night, possibly because of the presence of a light. In that case it might have happened without the light and I believe also in the instance you describe. I must add, finally, that probably because of the rarity of such instances, the law takes no cognizance of them. As a result, taking fish in this way is technically illegal. The only way to take bass legally in this State is with a hook and line.—C. W. Greene, Chief, Bureau of Fish

Deer again

Dear Editor: Your article, "Live-trapping Whitetail Deer," together with the "We Must Shoot More Deer" in the *Saturday Evening Post* of Nov. 3, 1956 highlight the excess deer population and attendant problems.

Has anyone dreamed up a solution to the problem of the deer that hide in safety in State parks during hunting hours, and then return at night to continue depredations in gardens and orchards? In this township there are four parks (two State and two Federal) plus a few large estates where hunting is forbidden. During the season the herds in these lands are enormous.

The deer-of-either-sex season will help some areas as a stop-gap measure, however, what is the objection to extending the regular season by a few days? Certainly some additional deer would be taken, in the extra days. The original idea of a short season was to permit depleted herds to rebuild. Obviously this objective has been most adequately fulfilled.

Art Bonney,
Hyde Park

• *Progress has been made on this problem, specifically for Letchworth and Allegany State parks in western New York where controlled deer seasons are regularly held. —Editor*

Winter work

Dear Commissioner: Our class thought you would be interested in our conservation work during the big snowstorm this past Winter. We are enclosing our project chart, and a photograph of our classmate, Anne Russell. From reports of observations made, the operation was successful. We made no attempt to tame the birds, and the project was discontinued as soon as they were able to forage for themselves.

Elaine Hill,
Class President, Grade 5,
Palmyra-Macedon Central School

• *I cannot tell you how pleased I was this morning to find among my mail your letter and the project chart showing the fine work of the fifth grade of Palmyra-Macedon Central School in feeding birds during the recent heavy snows.*

The picture of Anne Russell shows clearly what a difficult undertaking it was, and the fine chart shows how well all of your fellow students co-operated.

I have shown the letter and chart to our game technicians, who were greatly pleased at the good judgment you have shown. They say the food chosen, and the procedure you followed, were perfect.

I want to thank you and your class for your thoughtfulness, and I send my congratulations to you, your class and your teacher, for carrying out such a fine project. —Commissioner Charon J. Mauhs.

• *Commissioner Mauhs of the Conservation Department was so impressed by your letter and the project chart of the fifth grade work for wildlife during the recent snowstorms, that he sent them along to me.*

I am glad he did, because it is very encouraging to see the young men and women of our State taking such an interest in our great natural resources. It is fine, too to see boys and girls from the town and country working together as a team, and in such an effective way — Averell Harriman, Governor

Catskill trails

Gentlemen: On a recent camping trip some of my friends and I climbed Blackhead Mountain in the Catskills. We were very impressed by the numerous lookouts and the magnificent views—not to mention the enjoyable climb. My question is: Why doesn't the State maintain the trails on Blackhead, Black Dome, Thomas Cole and other mountains in the Northern Catskills? Is there any work being done in this field? If so, is it possible for any of us to participate?

Richard E. H. James, Freeport

• *The Department, a few years ago, considered the establishment of some trails in that section, but we were unable to get easements across privately-owned lands that were involved and, therefore, abandoned the project.*

The trails which are maintained by the Department in the Catskills region are described in Recreation Circular No. 9, available upon request from the Department.—W. D. Mulholland, Superintendent, Camps and Trails

Flower Mask

I cannot wander in a wood so far
But, in the deepest shade,
A violet radiant as a star
Smiles at me unafraid.

There is no waste so desolate
But some courageous bloom
Dispels the bleakness of its fate
With dew-distilled perfume.

The crocus pushes through the snow
And flouts the blatant blast,
Blue asters in the pasture blow
When Summer long is past.

I think that when from paradise
The sons of men were driven,
The angels donned a flower disguise
To lure them back to heaven.

Willard M. Grimes,
Volunteer Guide, Staten Island

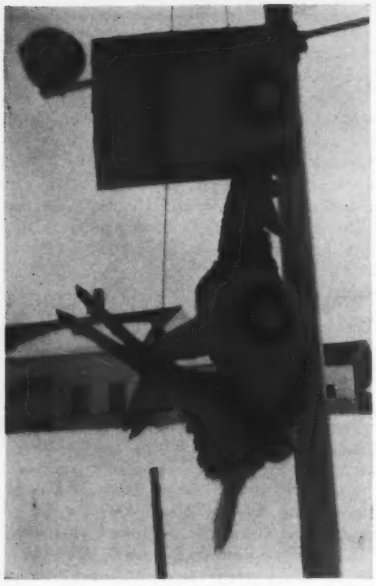
Devonian "battleship"

Dear Sir: Students have read your February-March, 1958 issue with great interest, but find no specific reference to the cover illustration by H. Wayne Trimm.

Can you identify the carniverous mammoth in the illustration and satisfy our sixth grade boys as to his habitat and age of existence?

Frances Berg, Librarian,
Lawrence, L. I.

• *Our apologies for obscuring the creature's identity. It is one of the Placoderms (armored fishes) called Dinichthys.* (see article—"300 MILLION YEARS AGO," Page 26, Feb.-Mar. issue) *This species grew to a length of some 30 feet and could be called "the battleships" of the Devonian Seas. Living in marine waters, Dinichthys was noted for its powerful jaws with front "teeth" similar to a parrot's beak.—Editor*



Deer killers

Dear Editor: On a recent jaunt to the Little Pine Lake area of the Adirondacks I found a deer that had been downed several times back in the woods, and cleaned up there, except for the hair and a few pieces of bone. In my estimation, this deer was the victim of coyotes.

While there is a lot said about coyotes and their depredations, I can't hold too much against them, while he kills for food only, and eats what he kills. This was the only instance I saw in the 10 or 12 miles I covered in what appears to be good deer country.

In contrast, near Brookfield, Madison County, in one deer yard alone, I found seven such mutilated deer and how many more there were no one knows. I saw a very small part of it. All this was done by three dogs, making one or more kills nearly every day until their luck ran out. Deer dogs kill for pure enjoyment and not for want of food. They kill thousands of deer each Spring, most of them containing a pair of fawns. While we have county bounties on coyote or "wolf" plus a perpetual open season to kill them in most any manner, and maintain state trappers to trap them, why, oh why can't we have some simple laws or quarantine a couple of months a year to curb a real savage and wasteful predator. It seems there is more sentiment here, and other places too, for the dogs than the deer, and please don't think I don't like dogs.

Orrin McClintock, Brookfield

• *I can't remember a Winter when we have had as much trouble with dogs running and pulling down deer as has been the case this Winter—and all across the State. I don't suppose we will ever know what the total loss is but I suspect it may be almost as heavy as occasioned by starvation. It is a real tough problem and one we aren't anywhere near solving.*

There are laws on the book—and we have done our best here with one release after another to the press calling people's attention to the loss and pleading with them to keep their dogs at home. Not all the deer-killing animals are unlicensed by any means. A great many of them are owned by people who just won't believe that their pets could do anything like that.

When it comes to really effective educational displays, however, I don't think I have seen anything better than that depicted in your photograph. That certainly brings the thing right home to roost.—Editor

Sugarin' time

Dear Sir: Being "sugarin' time" of course we get into various discussions and arguments regarding the industry, the vagaries of the weather and its various effects on the flow of sap, and so on. Several of my friends —some of them having been engaged in "sugarin'" for many years—insist that wind direction has a definite effect on the flow of sap; indeed, I heard over the radio just the other day a report which included the statement that the wind was just right for a good run. As nearly as I can get it, the wind must be from the west to insure a good run, and an east or southeast wind will slow the sap down to a negligible dribble, regardless of the fact that other conditions might be favorable. Can you find somebody who can enlighten me?

Another "colloquialism" I have run into quite often is the one which holds that, in transplanting trees other than nursery seedlings; that is, trees five, six years old, and over, one must be very careful to "orient" the tree in its new location so that its various "faces" face the same directions as those they faced in its original location. "They say" that if this is not done, the tree will either die, or, at best, take several years before it acclimates itself to its new orientation.

This, I have to say, I do not believe, since I have transplanted many trees older than six or seven years, without paying any attention to such "orientation," and had very good luck with having them take hold and grow right along. However, it is, of course, possible that I inadvertently "oriented" them, so it is still possible that there may be something in it. Is there?

Henry H. Gavit, Stony Creek

• *We checked with Fred Winch, Extension Forester at Cornell University, and on the maple sap question he advises: "There is no research on the effect of wind but there certainly is an effect on the flow of sap from maple trees based on the wind direction. The general consensus of opinion is that when the wind is in the southeast, south and southwest that there will be very little run and this has worked out from observation that we have had in many cases. It may be due to barometric pressure or it may be due to any of the many other conditions. However, sugar producers say that 1958 was a good year due to the fact that we had no south winds at all during the maple producing season, and that all of our winds came from the north and northwest. I can't give you any more help but that's the facts as we see them.*

As for "orientation" in transplanting trees, E. J. Eliason, our Supt. of Tree Nurseries has this to say: "I can't see how a seedling is any different than a tranpslant. On the basis of chance and considering the circle divided into eight parts, then only ⅛ of the planted trees would grow because they are out of "orient." This one should go back to the Orient!—Editor

State parks

Dear Editor: I wish to sincerely thank you for the "folder" sent me on the various State Parks. I had no idea there were so many desirable parks available to the public. You are to be congratulated for the work on the "folder." Information contained therein is most satisfactory. We truly live in "God's Country." We should never cease to be thankful to those who keep it "free and beautiful" but especially to God who gave it to us!

Ernest Carr, Lee Center

• *You have lots of company in admiring and using our State parks. Last year, New York's State Parks played host to more than 30 million people.—Editor*

Too many deer

The following letter to Milt Hick, District Forester for the Conservation Department in the Southern Tier, sheds another ray of light on the deer problem—and emphasizes again the need to maintain a herd in balance with its food supply.—Editor

Dear Mr. Hicks: I have an order in for 5,000 white spruce, which are all paid for and was wondering if it would be possible to cancel this order. The deer have destroyed so many here this year that I think it would be a waste of time and trees to set any more. I would allow this $25 to be applied on locust seedlings next Fall if it were possible. Will you kindly advise, and thanking you kindly, I am

John D. Young, Unadilla

Blonde grackle

Dear Sir: This afternoon I just saw a grackle at my bird feeder. It was a female and of the most unusual coloring. It was a light brown with a dark brown head. The eyes were of normal coloring being a pale yellow. It was with a flock of regular colored grackles and of identical size as the other females, so it was not a young bird.

I wondered if it is a rarity or not? Please let me know.

Mrs. C. Danahy, West Sand Lake

• *The color you described is rare for a grackle—'though I have seen this color in pheasants quite often. I think, however, that it is much rarer in small birds, or perhaps, because of their size, it goes unnoticed more frequently.*

I believe, from what I have seen, that such "blonde" color is rarer than the complete loss of pigmentation that produces albinism.—H. Wayne Trimm

Flatfish eyes

Gentlemen: Could you please answer the following questions: How many eyes has a flounder? Also, how many eyes has a fluke?

William E. Schreiber, Brentwood

• *Both the flounder and the fluke have two eyes just as do most other fish. However, these flatfish differ from other fish in that both eyes are on the dark upper surface of the fish. As you know, the flatfish lie on the bottom with the white side down and the dark side up, and they also swim in this position. When first hatched the young flatfish has one eye on each side of the head. However, after a certain period of time the eye from the side that normally becomes white moves toward the side that normally becomes dark, and in a relatively short time both eyes are on the dark side where they remain throughout the life of the fish.—Alfred Perlmutter, Senior Aquatic Biologist* *(See Flatfish letter pg. 45, also.)*

Two on one

Dear Sir: Thought you would be interested in this unusual fishing experience: My son-in-law, Bob Moseley, and a friend, were fishing for Otsego bass last August in Otsego Lake near Cooperstown. Bob hooked an Otsego bass (local name for whitefish) and while he was reeling it in decided he surely had a good-size fish because of the heavy weight on the line. When the fish was brought to the surface, they found he had not only an Otsego bass but also a large lake trout with teeth firmly set in the bass. Both fish were soon netted and in the boat and that's when the fun began. The trout had not been on the hook but had gripped the bass and retained his hold without putting up any fight until brought into the boat. In subduing the trout, one rod was broken and one fisherman wound up with a large black and blue section on his ribs and nerves pretty well shaken. The Otsego bass weighed two pounds; the lake trout 10½ pounds and was 31 inches in length.

The photograph shows Bob holding the lake trout while his son, Jim, holds the Otsego bass that caught the trout.

Harrison G. Strait, Hyde Park

Sick animals

Dear Editor: In the October-November, 1957 issue of THE CONSERVATIONIST I read a "Letter to the Editor" about a sick coyote. In a footnote you mentioned that such conditions, to your knowledge, aren't in existence here.

On March 16, 1958 I proved to myself that we occasionally do have a similar condition.

Earlier in the Winter I heard about a local farmer seeing an animal resembling a fox. The animal appeared to be in very poor health and had a rat-like tail with a tuft of hair on the end. A few days later one of my hunting pals saw the same animal. My first question was: "What have you been drinking?" Both men were very serious and told the same story about the fox being very unafraid.

A short time later I was trapping muskrats and upon checking my line one morning about daybreak, I saw him myself. After wiping the sleep from my eyes I was amazed to see the previous stories about the fox were very true. He wasn't afraid at all. Soon I had a new report from another fellow hunter. Each time the animal was seen, no firearm was present.

We decided to do something about it. We had a nice snow and the sun was shining, so I called together the fellows I hunt fox with every Sunday and we proceeded to track, while the others tried to drive ahead and cut him off.

The fox ran completely different from any I have ever tracked, zigzagging, backtracking and circling constantly. He very rarely ran in a straight path. We started the fox in East Aurora township and ran him about 4½ miles to the Town of Marilla. Here I happened to be on the track and caught the rascal lying on a snowbank asleep.

Clayton L. Hopper, East Aurora

• *Nope, what we said was: "Fortunately, we haven't heard that this condition is too prevalent here—." We'll stand on that.—Editor*

Sassafras

Dear Sir: Could you please give me the location of any growth of sassafras trees in this section of the State?

I know of about six trees in Rotterdam, between the New York Central tracks and Route 7 growing in sandy soil, but have been unable to find any in Scoharie County.

I would greatly appreciate any information.

Lawrence H. Stiver, Richmondville

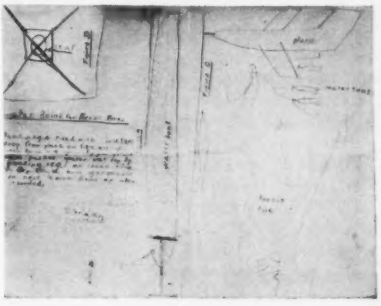
• *Sassafras grows mostly on sandy, stony or gravelly soils which are relatively warm, and which are acid. It grows usually with flowering dogwood, black and scarlet oaks, and where chestnut formerly was abundant. I do not know much of its distribution in Schoharie County, nor would I expect to find it abundant there but it is frequently encountered in the Hudson Valley from Glens Falls south. It is frequent in the woods and hedgerows around Voorheesville, Delmar and Albany, and is even more abundant to the south.—Ralph H. Smith, Game Research Investigator*

Satisfied customer

Dear Mr. Eliason, Supt. of Tree Nurseries: I just had to sit down and write you a little note to let you know how pleased I was with my shipment of trees. The white spruce, especially, were one of the best seedlings I have ever seen. I already planted all my trees and if they grow as well as they looked, my hat goes off to you and your staff. Thank you.

Stanley Zastempowski, Buffalo

• *"Eli," being human, like the rest of us, is pretty happy to receive comments like this one.—Editor*



Anti-fire bombs

Dear Editor: I have invented a bomb for putting out forest fires where you cannot get at the fire. I am sending a drawing of it. Will you please tell me if it is any good?

Thank you.

Mark E. Johnson (age 8), Fishkill

• *Sure is! The Conservation Department has a new 'plane (a DeHavilland "Otter") that specializes in dousing forest fires with water —only this one uses big tanks that rotate to spill out the water over the fire. Water has been dropped, also, in big plastic, water-filled "balloons" that burst on the fire area like a bomb.*

But we have nothing quite like your bomb. They're very clever, and show that you are really thinking.—Editor

Cayuga salmon

Sir: In the February-March issue we expressed the hope that the recent (1953) reintroduction of salmon into Cayuga Lake would continue to shape up. So far it has. Still no fantastic claims on numbers, but some anglers have made the statement that they were "going salmon fishing" and returned with a salmon within a reasonable length of time.

There is no official count on the total catch of salmon, but 35 reports have been authenticated by the Cornell Conservation Department census takers through May 4. Undoubtedly several times that number have been caught. Two daily limit catches (2 fish) are recorded and one angler is reported to have over 20 to his credit. Catches have been scattered around the lake. Surprisingly enough, the shoals at the north end have been the most consistent producer. . . . in perch, pike and bullhead territory.

In the size category Cayuga salmon offer no apologies. Largest on record so far went 9 pounds 6 ounces. This fish was from the first planting made in 1953, so was five years old. The most spectacular growth was exhibited by a fish of the 1955 lake planting that weighed in at 7.3 pounds. Some area anglers confidently expect Cayuga Lake to give Lake George a run in producing the record State fish in the next year or two. Could be!

Dwight A. Webster,
Prof., Fishery Biology,
Cornell University

"Monarchs"

Dear Sir: It's a rainy day, I've been looking through my back volumes of THE CONSERVATIONIST and I'm in a reminiscent mood, hence this letter. My inspiration comes from the article on New York State butterflies in the June-July, 1956 issue, particularly on the Monarch butterfly and its migratory flights.

Many years ago, in 1904 to be exact, my folks had a cottage for the Summer at Avon, New Jersey. It was not built up as much in those days and next to us on the east was a sizable grove of typical scrub pine covering several acres. I was 11 years old at the time and spent a good part of my time in those woods where my brother and I had built a "camp." On the morning in question I had gotten up early and gone out before breakfast to look at two box traps I had set the night before. Walking toward the ocean with the bright morning sun in my eyes, one dead pine which stood in an open space before me seemed to be enveloped in flames. It startled me at first and then I realized that it was actually the reflection of the sunlight on the wings of a host of Monarch butterflies that were perched on every branch and twig and literally covered the tree. They were all opening and closing their wings, I imagine in an effort to shake off the effects of a chilly night and warm up in the approaching sunshine and it was this that gave such a realistic effect of actual flames.

I recall running back to the house in great excitement with the statement that there were "a million butterflies in a tree outside," and dragging the family out to see them. I realize now that was a slight exaggeration, but there must have been hundreds and perhaps a thousand in the flock or whatever you call such a concentration. I reported my find to a retired Doctor who lived nearby and who was quite a "bugologist" and the two of us spent the morning watching, but not disturbing them. As they got limbered up, they started taking off, singly and in small groups, not all at once like a migrating flock of birds. By 11 a.m. they had all taken off but one that got stuck in a blob of pitch on the trunk of the tree.

I looked the next day, but they had not come back, so I presume they were simply making an overnight stop on their way south. The fact that they left in small groups makes me feel that they probably arrived there in the same manner and I wonder if some instinct leads them to congregate in one spot like that a bit further south as each night approaches.

Any article you read which mentions the Monarch butterfly always refers to their migrations, so it must be a well known and common occurrence, however in the 54 years that have passed since then, I have never seen such a sight again and I've spent plenty of time in the outdoors where and when an odd Monarch flits by.

I wonder if Mr. Wilcox, who wrote the article, ever saw a concentration of Monarchs like that and it would be interesting to learn how many of your large number of subscribers ever noticed any phase of their migration at all.

C. Albert Jacob, Jr., Scarsdale

• *You may be familiar with some of the work that has been done in recent years to mark Monarch butterflies and to trace their migration routes. I recall reading a while ago of some very interesting experimental work on this by a Canadian naturalist who developed a technique of banding Monarchs by cutting out a very small eyelet in the leading edge of the wing, then threading through the eyelet and around the leading edge a tiny paper band with the number and banding data inscribed thereon. This work, as I recall, was done in the Pacific Northwest and it was found that Monarchs in that area migrated seasonally to Lower California or Mexico. It was also discovered that these butterflies not only made the 3,000-odd-mile trip to the wintering ground but that they returned to the Pacific Northwest the following Spring and I believe that records showed that some individuals succeeded in making the trip two or three times.*

More recently I came upon an article in the Florida Naturalist *of January, 1958 written by Norman Sibley entitled, "Has the Monarch Lost Its Immunity?" Sibley, in this article describes the depredation of birds upon Monarch butterflies at their wintering-over colonies near Apalachicola, Florida. His interest is in the fact that after a number of years during which the birds paid little or no heed to the concentration of Monarchs in their wintering grounds, they have during the past two winters added butterflies to their menu and are making great inroads upon them. Previously it was thought that the Monarchs were "too bitter in taste for the birds." In passing he remarks on "many hundreds of Monarch butterflies during their southern movements; and by shaking the branches of such plants we seem literally to fill the air in the vicinity of such area with the Monarchs . . ."—Editor*

Deer friends

Dear Sir: Every Spring of the year a large number of deer congregate on the hillside directly across from Chenango Forks Central School which is located on Route 79. This herd sometimes numbers over 100 deer. This year the school youngsters even saw an albino deer in the herd.

Our students and the deer are silent friends. Every student in school, I am sure, has rooted for the deer to pull through this long, hard past Winter.

Mrs. Mary Crandall, one of our sixth grade teachers, has used the daily assembly of deer as a subject for the youngsters to write poems about.

Keep up the fine work you are doing in the efforts of conservation. Your magazine has no close rivals in its field in our school.

Norman J. Sweeney, Vice Principal,
Chenango Forks Central School

Following is a poem by George Sternberg; one of several written by Mrs. Crandall's sixth graders:

THE DEER

Out of the white floating snow,
Came the swift graceful doe;
With their tails lifted high
Looking for danger far or nigh;
With feet so graceful and swift
Bouncing across each snowy drift.

The Batten Kill

Dear Sir: I am making a research of the historic Batten Kill and have filed my first set of records of this stream with the Manuscript Department, State Library.

The Batten Kill derives its name from the Christian name of Bartholomew Van Hogeboom, first settler above Stillwater, New York about 1724. Bart is the abbreviation of Bartholomew, and thence Bart's Kill or Batten Kill. The Algonquin name was "Tightilligaghticook" and "Di-on-on-dah-owa" was the Iroquois name. The headwaters of the Batten Kill rise on the farm of James H. Beebe, "Beebe Meadows," located about one half mile north of East Dorset, Bennington County, Vermont.

On this farm are three springs, within three rods of each other, the waters from these springs flow southward and form the Batten Kill. From Arlington, Vermont it flows westerly to the Hudson at Clark's Mill, Washington County, New York. From East Dorset to the New York, Vermont state line, it is 19.9 miles long and from this point to the confluence of the Hudson, it is 29.2 miles, total length of the Batten Kill is 48.9 miles.

Hugh P. Graham,
Cohoes City Historian

• *The Conservation Department owns 12 miles of public fishing rights on the Batten Kill; one of the finest trout streams in the east.—Editor*

Campsite prevue

Dear Sir: Am enclosing a picture which I thought would be of interest for your magazine.

This is a picture of George Purdon, Ilion, N. Y. with a 10-pound lake trout which he caught last August in Lewey Lake while he was camping at Lewey Lake campsite.—Howard Brown, Caretaker

Copper sulphate and fish

Dear Sir: In your October-November issue of THE NEW YORK STATE CONSERVATIONIST you had an article dealing with license fees and conservation efforts.

I am all for a raise in the license fees *if*, and this is a big if, the money is channeled in the right directions.

I am a fisherman and I have seen some things on Skaneateles Lake that make me "do a burn." Trout fry which have been obtained from the State by the local sportsmen's club are released and they are no sooner free than the City of Syracuse sends a team of "experts" out to put copper sulphate in the lake to kill the algae. Now what are those fry supposed to live on?

My plea is rather than spend money foolishly on trout fry to be killed off by "experts" from Syracuse some method of treating the water for Syracuse after it leaves Skaneateles Lake be instigated. Then it will be time enough to put the young trout into the lake.

Nelson Jameson, Auburn

• *The effect of copper treatment of water supply waters on fish production is not clear. Theoretically, in certain waters, it should reduce productivity slightly, yet in the most thorough study which has been made, on Lake Mendota in Wisconsin, no definite effect on fish production has been demonstrated. This lake has been treated periodically for years.*

If fish kill is avoided in shallow waters, the effect of dosages intended to control algae in the surface layers is negligible after diffusion throughout the water of the lake. Thus it could affect only the food organisms in the shallow area. In the upper layer, the major portion of the water and lake bottom would be unaffected.

Even in shallower ponds where the dosage may be applied in terms of the entire body of water, while there would be a reduction in the number and type of food organisms, the resultant fertility from algae decomposition stimulates bacterial growth and the formation of bacterial sludges, which are the main source of food supply for the organisms utilized as food by fish fry.

In consequence, the increased growth of the organisms remaining after treatment may largely, if not completely, counteract the effect of the treatment and the overall productivity remain essentially the same.

It is my considered opinion that, unless a direct kill of the trout fry or other species can be demonstrated as a result of treatment of the lake, there is little reason to suppose that the fish are adversely affected through the food supply. The game fish are not feeders on the type of plant growth this treatment attempts to destroy or prevent. I do know that at times, in shallow water areas, fish have been destroyed by the treatment, however, even the largest kill has probably not seriously affected the economy of the lake. The Department does, however, expect that Syracuse shall make application of the copper sulphate in such manner and in such a distributed concentration to prevent such occurrences as much as possible. I believe the application this year was without any demonstrated loss of fish.—G. E. Burdick, Senior Aquatic Biologist

More on Morse

Dear Editor: I saw with much interest the short note entitled, "And Now Mother," in the April-May issue of THE CONSERVATIONIST. May I add the following excerpt from a communication addressed to me following the publication of the February-March issue, relating to the picture which I sent in of the little trout fisher. Mrs. David Ennis, 35 High Street, Lyons, N.Y., wrote me in part as follows:

"The boy in the post card picture you sent to THE CONSERVATIONIST was in later years the manager of P.Y. [Penn Yann] Theatre (in the 30's) and his last name was Morse. I don't know if he is still living but if you care to write to Sydney Ayres, editor of the *Chronicle Express* in P. Y., who is interested in local history and has lived in P. Y. all his life, I am sure he can tell you all about Mr. Morse. The scar on his nose was evident enough even in middle age and the incident well known."

Arthur S. Hopkins, Exec. Sec.,
Northeastern Forest Fire Protection
Commission, Chatham, N. Y.

Wading birds

Dear Editor: I enjoyed Dirck Benson's article in the April-May issue on wading birds of New York, and particularly enjoyed Wayne Trimm's accompanying painting. This is a fine addition to the series you have been running on New York fauna and flora (you may remember that I have contributed to this series myself; "Shorebirds," in the Oct.-Nov., 1955 issue). I admire the double-page "habitat" type of painting, which can tell so much more about the birds than the more conventional individual vignettes.

In his write-ups of the individual species of marsh wading birds, Dirck sold my favorite State short as a home for herons, possibly because of out-of-date source material. The Common Egret and Snowy Egret, said to breed in "southern states," have both bred off and on at various localities on Long Island, the Snowy since 1949 (now flourishing) and the larger species since at least 1956—earlier records may have escaped my attention. Dirck describes the Yellow-crowned Night Heron as "accidentally" a breeding bird in New York. It has been breeding almost every year since 1938 on Long Island in at least small numbers.

Finally, the Glossy Ibis, described as a "native of tropical regions," has been breeding in the famous heron colony at Stone Harbor, New Jersey, since 1955. This easily accessible colony (an extension of a city street runs right past it) is highly recommended as a fine place to study the large wading birds.

Kenneth C. Parkes, Associate Curator of Birds
Carnegie Museum, Pittsburgh

• *We appreciate being brought up to date. —Editor*

Flatfishes

Dear Sir: Please explain the difference between what you call a fluke and flounder. Is it that fluke is a local name for flounder? What is the difference between flounder and halibut? Occasionally we get a fish that is shaped like a flounder, but his mouth opens the opposite way from a flounder's mouth. Also the scales feel rough like sandpaper. What is it called?

I have asked these questions of several people in the seafood business, but never had a satisfactory answer. Please give me this information. Thank you.

Luther M. Lee, Jr., Bernettsville, S. C.

• *There is a great deal of confusion about flounder and fluke, since the same fish is called one or the other even in the same locality. The flounder is right-sided; ie., pigmented on the right side, from the fish's point of view. In New York, flounders appear each Fall and remain in our inshore marine waters until Spring. Its mouth is small.*

The fluke, on the other hand, is left-sided, and appears in our inshore waters each Spring, remaining until October, at which time migration occurs to wintering grounds in offshore waters 20 to 100 fathoms.

In your area there are at least three species of fluke, all left-sided. They may look very much the same, but can be distinguished by external markings.

The halibut, biggest of the flatfish, is right-sided, with a large toothed mouth similar to the fluke's. The halibut grows to much larger size than the fluke, for records prove them to weigh as much as 600 pounds, gutted. This is a cold-water fish, occurring in deep water in the cold northern regions on both the Atlantic and Pacific coasts, ie., Greenland, Newfoundland, Nova Scotia.—John C. Poole, Aquatic Biologist (Marine)

Trees and children

Dear Sir: Last week I had the pleasure of talking with Robert White, a conservationist and operator of Gardeners' Village, a nursery located in West Hempstead, Long Island.

He initiated a project three years ago whereby he has given to the public schools in this locality, trees to be used on schoolyards, play grounds, and homes of school children in commemoration of Arbor Day.

This year, Mr. White gave 1,000 sugar maple saplings to our Terrell Avenue School for Arbor Day planting. Traditionally, this school has had a tree planting program annually as a conservation activity. The big maples in front of the school stand as evidence of the Arbor Day celebration 30 years ago when the school was much smaller than today. In fact, several of the present day students recall the stories their parents related of how they participated in the planting of these now beautiful maples.

Today, we know how much the bulldozer has changed the face of Long Island and Oceanside particularly, where our marshes have been filled in for housing developments with many trees removed or destroyed.

This year each of our 775 school children, from kindergarten to grade 6, all went home carrying a sugar maple tree for their own back yard to further enhance the beauty of their village. This was in addition to enthusiastic participation in school planting.

Marion E. Smith, Oceanside

• *Projects of this sort will have a lasting effect in giving appreciation of conservation and a real interest in the beauty of nature to our future generations. One of the second grade clases leaving school with their trees for home planting is shown in the accompanying picture.—Editor*

Insect control

Gentlemen: I am interested in obtaining information on methods for eliminating or controlling flies and mosquitoes in a limited area. I live in a residential area approximately 2,500′ x 2,500′ having a small brook and swampy area along one side. We intend to have the area sprayed with D.D.T. twice a week from 1 June to 1 September, by airplane. We also desire to place some insecticide in the stream for the purpose of killing insect larvae, similar to the procedure employed in Old Forge in the Town of Webb.

We desire information on what changes in the D.D.T. formula are required to prevent insects from becoming immune to this insecticide. We also desire information as to where we can obtain the blocks of D.D.T. which are placed in the streams in the Town of Webb area. No such thing is available from retail stores in this area. We would also like to have your opinion on the spraying procedures mentioned above and any additional information you may have on the subject.

Alan R. Barnum, Whitesboro

• *We enclose leaflets prepared by Dr. Donald L. Collins, State Entomologist, Education Department, Albany, which explains in detail, controls that may be tried. You should bear in mind that it is going to be very difficult to keep biting insects out of a small area such as yours by limiting treatment to that area. Due to the infiltration of insects from outside a treated area, control improves in proportion to the size of the area treated. I believe it is also important to keep in mind that the treatment outlined by Dr. Collins for black fly control is specific for that pest and would have little effect on mosquitoes, deer flies or punkies.*

You state that your present plan of control is to treat the area twice a week with aerial applications of DDT. It appears that you are treating the area excessively. Ordinarily, treatment with a 6 per cent DDT solution remains effective in biting insect control for a period of two or three weeks. You do not give either the strength of DDT being applied or the dosage rate per acre. It is our experience in aerial applications for the control of adult flies that a 6 per cent DDT oil solution applied at the rate of one gallon per acre is effective. Even with the 6 per cent material, precautions will have to be taken to prevent the poison from getting into gardens, drinking water supplies and brooks or rivers inhabited by fish.

You will note in Dr. Collins' suggestions for black fly control by aerial applications, that only a very limited quantity of DDT is applied directly to brooks. Precautions should also be exercised in the use of DDT plaster blocks. Such blocks must be accurately made so as to contain the proper quantity of DDT for disintegration in a certain size stream and the blocks must be correctly distributed and spaced in the stream. Damage is likely to result from miscalculations or from a common attitude of users that if a little DDT does a good job a lot of DDT will do a much better job.

I do not know of any business organization that makes DDT plaster blocks for sale to the public. Dr. Collins explains plaster block construction on the last page of his article on black fly control. Should you find that the insects you want to control are immune to DDT, it will be necessary for you to substitute another poison for DDT if effective control work is to continue. If immunity does occur, write to us, and we will make recommendations for a substitute. Adjustment of the DDT formula being used through increasing the percentage of DDT would be apt to result in damage rather than in obtaining a more effective control. Finally, we strongly recommend that you endeavor to secure technical advice on a safe procedure to follow in your operation and thereby avoid any chances of causing damage unnecessarily.

I feel sure that Dr. Donald L. Collins, State Entomologist, New York State Science Service, Education Building, Albany, New York will be glad to give you additional advice if you contact him.—C. J. Yops, Supt., Forest Pest Control

Duck stamps

Dear Sir: I read with considerable interest Don Foley's article about Duck Stamp Sales.

While I agree that judging from the stamp sales it would appear that there are roughly about 80,000 duck hunters in the State of New York and approximately 2,370,000 in the United States, I think that, from the duck's point of view, the situation is not quite that threatening.

I am neither a duck hunter nor a stamp collector but have been exposed to both species and I think the latter has not been taken into account.

Actually, serious collectors (who outnumbered the duck hunters) frequently specialize in domestic issues which, since they are listed in the catalog, include the annual duck stamp. The collectors I know buy the stamp at the post office and keep it unmarred and undefaced, year in year out. While some are collected after they have served their intended purpose, as a rule by youngsters who cannot plunk that much money down for one stamp, the by far greater number is embalmed in an album without ever getting near a duck.

I believe an inquiry directed at *Lynn's Weekly Stamp News*, in Sidney, Ohio might produce a reasonably accurate estimate of the number of duck stamps bought annually by collectors.

Hoping that this ray of hope will be of some consolation to the almost outnumbered ducks, I am

Rudolph G. Hosse, Croton-on-Hudson

• *I realize, of course, that not all duck stamps are sold to hunters, but from what we know of the situation right now, it appears that at least 75 per cent or 80 per cent of them do go to gunners. We get figures from the Post Office Department as to their sales of these stamps through their Philatelic Agency, but these out-of-date stamps account for only about 2 per cent. Hard items to pin down are the exact numbers, as well as their distribution to the State, sold to stamp collectors during the regular sales period.*

Thanks for the tip on the Weekly Stamp News. I will run it down. And if you can think of any other possible angles of approach I'd be very glad to hear them.

Also, I'm sure the ducks will be glad to know that you are on their side, no matter what. So are we.—Donald D. Foley, Game Research Investigator

Forestry

Dear Sir: As a student of the St. Laurent High School, Montreal, Canada, I have always been interested in the field of conservation and I am always eager to learn something new in this field.

Being a subscriber to your magazine I feel that you are in the best position to answer my question. The question is, which country has the best organized forest service in the world and which country was the first to pioneer in this field?

Also, who were the countries to produce the best scientists in the field of forestry? I heard that Germany had the best scientists in forestry and was one of the pioneers in this field.

Gerald Krenz, Montreal

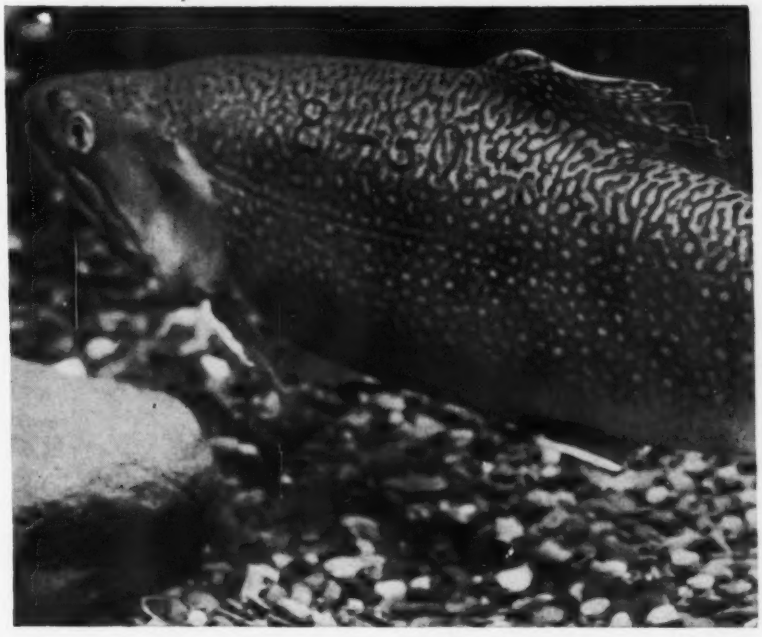
• *The questions you ask in your letter are not the sort that can be answered definitely and precisely.*

Of the bigger countries, Germany certainly had—and probably still has—the most complete and most effectively organized forest service, and this in spite of the losses of men and woods incident to World War II. Today, Sweden, Switzerland and Denmark might be challengers.

Germany as a united nation dates only from 1870, but certainly the states from which the German Empire was formed were the pioneers in forestry.

From 1785 to World War I, most of the great names in forestry were German—Hartig and von Cotta, in Germany; Opperman, in Denmark; Schlich in Britain; Fernow and Schenck, in America.

Who now produces the "best forestry scientists" would be debatable, for forestry is a very broad field. But all of Western Europe—from Finland to Spain—the Russian Empire, Great Britain, South Africa, Canada and United States are working hard at the forestry business, doing good work, and producing able men.—E. W. Littlefield, Assistant Director Lands & Forests



Branded trout

Dear Sir: In the interesting article "Left Over Hybrids" you state, "a technique of branding trout has been developed." I failed to see on any of the photos evidence of branding. Could you inform me where it is?

Further, "The catch of sports fishermen," etc., etc., "where both parent and hybrid trout were planted, was composed of three to six times as many fish of the hybrid stocks as of the parent race." This is somewhat unclear. Just what does it prove?

David B. Greenberg, Hopewell Junction

• *Due to limitations of space the photo of branded trout (see photo herewith) was left out of* THE CONSERVATIONIST *article. Unfortunately, the wording was not changed and the words "see photo" must have been confusing. Thanks for writing to us about the omission.*

As to quotation regarding test of hybrid trout, it is generally the purpose of planting trout to have them caught by anglers. Many studies of trout planting have shown too few actually return to the creel to justify the expense of planting. Hence, the higher return of hybrid trout is of considerable significance in fish management.—Dr. John Greely, Senior Aquatic Biologist

The "Ol' Willer"

Dear Sirs: You have picked with the help of "kids" (who don't understand) the maple for a "State Tree." We are just getting through with "sap and sugar" of Spring.

Now you remember it's about time to ram around the creek where the "Ol' Willer" is hangin' on the bank to keep the "Ol' Swimmin' Hole."

You got to see if the bark is peeling for "wissel." You remember if it was a "good un'," you gave it to a pig-tailed girl.

It was the only tree you could cut a fish pole with a broken-bladed knife to go "suckerin' and horn dacin.'"

You remember the old limb hung over the "deep hole," you held your nose, shut your eyes and jumped in. In the "big hole" in the trunk you hid your "smokin's and matches."

I am getting to be an old man but from Spring till after school time give me a "Willer."

Don't you know it's Spring?

Lockwood Brom, Minaville

• *Yes, we remember. We agree, too, that the willow is a strong contender for the honor bestowed upon the maple.—Editor*

Vinegar and tomato juice

Dear Friends: As I am a hunter of 70 years and enjoy your and our CONSERVATIONIST very much, I have something that I would like to have you print as it will benefit dog owners and especially 'coon hunters.

This is it: If a dog gets in a mess with a porkiepine just soak a bath towel in vinegar good and strong and wrap it around dog's head or wherever the quills may be, for about 20 minutes and the barbs will close and you can pick them right out.

Also, if you have a pet dog who gets messed up with a skunk wash him with tomato juice and it will almost all go away.

Eugene S. Mack, Cobleskill

• *We thank you—and many a dog owner will, too. Wonder how it feels, incidentally, to have one's head wrapped in a hot, vinegar-soaked towel for 20 minutes?—Editor*

Credits

First cover, Clay McGauhy; second cover, pages 36, 39, Nick Drahos; 2, 3, 16, 37, Earl McGuirk; 4, 5, U. B. Stone; 6, 7, Eleanor E. Hanlon; 9, 15, 18, Roy Irving; 10, 11, 12, Joseph Dell; 13, Charles Deuel; 17, Ellen Edmonson, Irving; 19, G. S. Brown; 20, 24, 25, fourth cover, H. Wayne Trimm; 21, John C. Poole; 22, 23, 26, Leonard Lee Rue III; 29, Trimm, Cornell University; 34, Bill Taubman; 38, Arthur H. Cook; 47, Pennsylvania Fish Commission; third cover, Clayt Seagears.

The Inside On The Outdoor Series

The Mouskret, the Duck and the Snappy Turkle

(With Flowers to the Froj)

ONE day a young snappy turkle was browsing around a glut of garbage some joker had thrown in the pond. Included in this fatuously foul mess of potential mal de mer was the lid of a coffee percolator—about six cup size. The little glass dome was missing and the thing lay like a big shiny cruller between an old catsup bottle and a jar of spoiled seckle pears.

Beyond the lid's open port hole a pale, soggy hunk of ham rind lay like a sudsy sea. But it was eating meat to the snappy turkle which of course stuck its head through the hole to get it. It was a one-way entry. The turkle couldn't get its head back through and he was stuck with it.

Now a snappy turkle going around with its head through a percolator lid fortunately is something you don't see every day but all the people in the pond saw it and nobody seemed to care. Even the turkle didn't give it much of a thought. Which wasn't particularly signinficant because this peanut-brained chelonian didn't have much of a thought available in the first place.

The percolator lid not only became a pain in the neck to the turkle but cramped his style as well. No more sneak attacks. No more camouflaged ambushcades. No more lightning strikes. Everybody could see him a mile off. The snap was gone from snappy. He was reduced to living entirely on carrion. Sometimes pickings were pretty slim. Snappy turkle was forced to travel constantly to find it.

Finally the pond people felt sorry for him and, also, they were grateful for this combined garbage disposal plant and water air conditioning system.

The years went by and the turkle grew and grew. And finally the point was reached when his neck was so tight in the hole that he could hardly swallow. Normally, a snappy turkle in such a situation would be a great relief to the pond people. But several generations had found this one apparently harmless and finally they even elected him Sanitation Commissioner. You will agree that such an honor is exceedingly rare among snappy turkles.

One day he laboriously swam into North Bay where some of the other pond people were fooling around and he blew some bubbles near the duck.

"How you perking?" Duck asked Snappy Turkle.

"Not too perky," said Snappy. "I can't hardly swallow—this thing is so tight. I need help."

"Maybe you could use some swallering lessons," suggested great grandfather Froj rather timidly. He had never *really* learned to trust Snappy and he kept safely on the other side of an old log.

"Maybe you said a mouthful," answered Turkle, drooling. "What can you do for me?"

"I suggest," said Froj, "that we go over to the fairway and I will give you this lesson."

So off they went—the four of them (by then Missus Mouskret, who had been busy gathering grass for her babies, had joined the party) and they climbed out on the close-cropped grass.

Now this leg of the pond served as a water hazard for the golf club's 14th hole and very often slightly off-course tee shots sent the balls trickling along nearby. Sure enough, a ball soon came rolling slowly along towards them.

"Watch me," said Froj.

He took a couple of hops, opened the great white cavern of his mouth, gulped up the ball and sat there a moment depressing his bulbous eyes one after the other so that they didn't show at all. Then he sat up.

"How's that for swallering," he said. "I just push it down with my eyes." He was right, too.

"Wonderful," said Missus Mouskret. "That ball should give you a better hop."

"What's the score of this ball game?" asked Snappy.

"*Who's* the batter?"

"I said *better hop*," Mouskret answered, tapping her head significantly. "Anyway I don't think this lesson can serve any useful purpose. Snappy can't swaller even if he *could* use his eyes like friend Froj."

"What we gotta do," said Duck, "is get that thing offa Turkle."

"Now you're quackin'," said Turkle.

Froj looked at Missus Mouskret. "You're a furbearer," he said, "so you got sharp teeth. You could chew it off, maybe huh?"

"Don't call me a furbearer," Missus M. shouted, "or otherwise you is a skinbearer and Duck is a featherbearer and Turkle is a shellbearer."

"Don't just argue," said Duck, "or poor Turkle will die and we'll all be pallbearers."

"That's a really, truly, genuwine-type thought," said Turkle dismally.

"Well," said Froj to Mouskret, "waggle your tail over and get busy."

"Waggle my tail?" said Mouskret. "*That's* something *you* can't do either."

"Well I could," Froj said.

"Hmm, he *had* something there," Duck added thoughtfully.

"I suggest," said Froj to Mouskret, "that you quit going around the end and chew this over."

"Wish I could," Mouskret said, "but my teeth really ain't so good on metal. Besides my gums are sore from grubbing up thistles. Tell you what, though, I got a big fat cousin sitting right up there now eating the top out of that hemlock. Name of Porkypine. He really goes for kitchenware. Why last Summer he set on a 20-inch skillet and——."

"Okay, okay," said Duck. "I'll fly up and tell him we've got some high-class stuff down here."

So he did—and pretty soon Porkypine shuffled up to Snappy Turkle and got him to arch his neck for a better angle. There was a terrific grating and squnching and in no time the percolator lid was off.

The Turkle str-etch-ed his head way out, flexed his neck and tried a few giant-size gulps. "Well now," said he, "that puts me right back in business." And like lightning he struck out treacherously and bit poor Froj right smack in two. Then he grabbed up the pieces and slid down the bank into the pond—for snapping turtles can eat only when under water. He went so fast he dropped the batch of business cards he always carried hidden safely up under his tough shell.

"My gosh," said Duck. "I always thought that character's name was *Snappy Turkle*—but what do you think it says here?"

"What?" they all chorused.

"We might have known," said Duck. "It's Sergesky Krushavetsky."

—CLAYT SEAGEARS

(SUPPLEMENT TO THE NEW YORK STATE CONSERVATIONIST, JUNE-JULY, 1956)

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THE NEW YORK STATE

Conservationist

Volumes Eleven Through Twelve

From August-September, '56 to June-July, '58

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ON—October-November
DJ—December-January
FM—February-March
AM—April-May
JJ—June-July

(Compiled by Roland B. Miller)

The index for Volumes 1 through 6 was a supplement to the June-July, 1952 issue; the index for Volumes 7 through 8, was a supplement to the June-July, 1954 issue; the index for Volumes 9 through 10, was a supplement to the June-July, 1956 issue.

Note: Several important items from the Back of the Book and Letters to the Editor sections appear in this index (as well as in previous indexes). If title does not occur in regular issue table of contents, look for it in these sections.—R. B. M.

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Picnic Area—Beaverkill Public Campsite	Clayt Seagears	JJ	57
Salamanders and Lizards of New York	H. Wayne Trimm	JJ	57
Showy Lady's Slippers	Nick Drahos	JJ	58
Signs of Autumn	H. Wayne Trimm	ON	57
Small Game Hunting Prospects (Cottontail)	H. Wayne Trimm	AS	57
Small Game Hunting Prospects (Grouse)	Louis A. Fuertes	AS	57
Spring	H. Wayne Trimm	AM	57
Spring Song	Leonard Lee Rue III	AM	57
The Crossley Survey in New York	Roy Irving	FM	57
The European Hare in New York	H. Wayne Trimm	FM	57
The Future in Furs (Mink, Muskrat)	H. Wayne Trimm	ON	56
The New Snow	H. Wayne Trimm	DJ	56–57
The Old Hunter	Hy S. Watson	ON	56
The Rain Falls	H. Wayne Trimm	JJ	57
The Sargent Pond Overnight	Larry Pringle	DJ	57–58
The Squirrels of New York	H. Wayne Trimm	FM	57
Turtles of New York	H. Wayne Trimm	JJ	58
Want More Rabbits? Here's How (Food and Cover)	Joseph Dell	DJ	57–58
Waterfowl Marshes and Menus (Hardstem Bulrush, Wild Rice, Sago Pondweed, Three-Square Bulrush)	H. Wayne Trimm	FM	58
Wet Boots	Hy S. Watson	AS	56
Wetlands, Water and Wildlife (Duck Hunter)	H. Wayne Trimm	AS	57
Winter Sky	H. Wayne Trimm	FM	58
Woodland Scene and Indians	H. Wayne Trimm	AM	58

BIRDS

Birds and the Cyclometer	H. Wayne Trimm	DJ	56–57
Canada Geese		DJ	56–57
Feather Structure		JJ	57
Marsh Waders of New York	Dirck Benson	AM	58
Notes on the Great Horned Meat Hook	Clayt Seagears	FM	57
Primary Waterfowl of New York	Donald Foley	ON	56
Ruby-Throated Hummingbird	Rosemary Clarke	AS	57
The Killdeer	Karl E. Bartel	JJ	57
The Old Squaw	Clayt Seagears	FM	58
The Ring-Billed Gull	John B. Belknap	DJ	57–58
Upland Game Birds of New York	Charles Brown	ON	56
What Do Owls Eat—How?	LeRoy C. Stegeman	DJ	57–58
Winter Birdlife in New York State	Fritz Scheider	DJ	56–57

BIRD PLATES
(In Color)

Canada Geese	H. Wayne Trimm	ON	56
Catbird and Tree Toad (A Mouthfull)		AM	58
Children of the Winter Sea (Old Squaws off Long Island)	Clayt Seagears	FM	58
Duck Banding at James Bay	Dick Ryan	DJ	56–57
Feather Structure	H. Wayne Trimm	JJ	57
Flying Geese	H. Wayne Trimm	AM	58
Geese—Spring Clouds	H. Wayne Trimm	FM	57
Great Horned Owl	H. Wayne Trimm	DJ	57–58
Grouse (Small Game Hunting Prospects)	N. Y. S. Museum	AS	56
Northern Raven, Canada Jay	Louis A. Fuertes	FM	57
Owls of New York	H. Wayne Trimm	DJ	57–58
Pair of Old Squaws in Winter Plumage	Clayt Seagears	FM	58
Pheasant (Small Game Hunting Prospects)	H. Wayne Trimm	AS	56
Ring-Billed Gull	H. Wayne Trimm	DJ	57–58
Ruby-Throated Hummingbird	Louis A. Fuertes	AS	57
The Owls of New York	H. Wayne Trimm	DJ	57–58
Wading Birds of New York	H. Wayne Trimm	AM	58
Waterfowl, Upland Game Birds (Lesser Scaup, Black Duck, Mallard, Wood Duck, Ruffed Grouse, Ringneck Pheasant, Hungarian Partridge, Woodcock)	H. Wayne Trimm	ON	56
Whazit? (Baby American Bittern)	H. Wayne Trimm	AM	57
Winter Birds	H. Wayne Trimm	DJ	56–57

BLOW-DOWN
(Of Nov. 25, 1950)

Operation Blow-Down	Charles F. Baar	DJ	56–57

CAMPSITES

The Pitch on Family Camping	Clayt Seagears	JJ	57

CANOEING

Canoe Craft	Clayt Seagears	AM	58

CONSERVATION
(General)

A Key to the Future	Irving B. Stafford	AM	57
Conservation and World Population	George Pitluga	ON	56
Last Chance? (Editorial)		JJ	57
Pond Plants	Harlan B. Brumsted	AS	56
Spring (Editorial)		AM	58
The Grange in Conservation	Herbert J. Thomsen	FM	57

CONSERVATION DEPARTMENT

A New Day	A. W. Bromley	AM	57
Anniversary (Editorial)		AS	56
Conservation in the Empire State	Sharon J. Mauhs	ON	56
Cynics (Editorial)		FM	58
Fish and Game—for the Future	W. Mason Lawrence	AS	57
Fish and Game for the Future—Part II	W. Mason Lawrence	ON	57
New Patrol Boat		AS	57
Out of This World (Editorial)		DJ	57–58
Pharsalia (Editorial)		DJ	56–57
Proposed Central Office and Field Reorganization (A New Day) (Chart)	Roy Irving	AM	57
The Fish and Game Dollar	W. Mason Lawrence	JJ	57
Today's Resources—Tomorrow's Heritage (Editorial)		ON	56

CONSERVATION EDUCATION

Adult Education—A Great Potential for Teaching Conservation	Floyd E. Carlson	AS	57
Applied Conservation Education		ON	57
Arnot Teachers' Workshop	Richard B. Fischer	FM	58
Conservation in School	Allen Anderson	AM	57
Conservation Library, Part 4		AS	56
Conservation Library, Part 5		DJ	56–57
Conservation Library, Part 6		FM	57
Conservation Library, Part 7		DJ	57–58
Conservation Library, Part 8		JJ	58
Seneca Lake Workshop	Wm. G. Bentley	AS	57
Sportsmen and Conservationists	John D. Bulger	JJ	57
Sportsmen's Workshop		ON	56
Tackapausha Nature Preserve	Meade C. Dobson	ON	56
The Camp at Pharsalia	John T. Slattery, Charles F. Baar	DJ	56–57
The Hunter (Editorial)		ON	57
The Hunter Training Program	Bryan E. Burgin	AS	56
The National Boy Scout Jamboree	Ted S. Pettit	ON	57
The Ranger School at Wanakena	Roy Irving	DJ	56–57
The Sargent Pond Overnight	Larry Pringle	DJ	57–58
We Teach Teachers Conservation	Dr. John Urban	FM	57

COUNTIES
(With Maps)

Erie County	Roy Irving	AM	57
Livingston County	Roy Irving	DJ	56–57
Monroe County	Roy Irving	ON	57
Montgomery, Schenectady Counties	Roy Irving	JJ	58
Niagara County	Roy Irving	JJ	57
Genesee County	Roy Irving	DJ	57–58
Ontario County	Roy Irving	AS	56
Orleans County	Roy Irving	AS	57
Wyoming County	Roy Irving	FM	57
Yates County	Roy Irving	ON	56

CRAFTS

Conservation Fishing Chair	Dr. Francis C. Shaw	AS	56
Fiberglass Adirondack Guide-Boat		FM	57

FISH

Alewife Mortality	George E. Burdick	AS	57
Crappies	U. B. Stone	JJ	58
Long Island's Fluke	John C. Poole, Irwin M. Alperin	DJ	56–57
Red Salmon—The Fish and Its Habits	C. W. Greene	AM	58

FISH CULTURE

Bath Hatchery Restored		ON	57
Left Over Hybrids	John R. Greeley	AM	58
More Muskys	U. B. Stone	JJ	58
New "Wrinkles" at the Hatchery			
Rice Type Feeder	K. B. Nichols,		
Compressed Air Fish Feeder	David G. Haskell	AM	57
Rainbows for Afghanistan		FM	57
Splake in New York	Charles R. Deuel	JJ	58
The Hatchery Year	K. B. Nichols	ON	57
25th Year for Cortland Hatchery		DJ	57–58

FISHERIES
(Commercial)

Hydraulic Clammer	Alfred Tucker	AM	58

FISHING

A Prediction (Editorial)		AM	57
Lake George Landlocks—Again	Roland B. Miller	FM	58
1957—A Record Year for Lake George Landlocks	Roland B. Miller	ON	57
Return to Cayuga	Dwight A. Webster	FM	58
Salt Water Angling License?	A. H. Underhill	AM	57
The Red Salmon—How to Catch Him	Ely Jelliffe	AM	58
Trout Fishing at Camp Drum	Donald G. Pasko	AM	58
What is a Game Fish?	A. W. Bromley	JJ	57

FISH MANAGEMENT

Carp Control—A Progress Report	Howard A. Loeb	FM	57
Deep Water Shocker	Howard A. Loeb	AM	57
Displaced Fishes	Robert G. Zilliox	DJ	57–58
Federal Fish Stocking	C. W. Greene, C. E. Heacox	AM	58
Flomos		AM	57
Fluke Tagging Program	John C. Poole	AS	56
Lake Erie Fisheries Conference		ON	56
New Trout for None	Robert G. Zilliox	AM	57

FISH PLATES
(In Color)

Ancient Fishes of New York	H. Wayne Trimm	FM	58
Calico Bass	Clay McGauhy	JJ	58
Finger Lakes Rainbows—Spawning Habits	H. Wayne Trimm	FM	57
Finger Lakes Rainbows—Part III	H. Wayne Trimm	JJ	57
Fluke	H. Wayne Trimm	DJ	56–57
Fluke	H. Wayne Trimm	JJ	58
Lake Lamprey (Female, Male) (The Lamprey in New York Waters)	Ellen Edmonson	AS	56
Lake Trout	Ellen Edmonson	JJ	58
Prehistoric Fish	H. Wayne Trimm	FM	58
The Red Salmon—How to Catch Him	A. C. Petty	AM	58

FISH RESEARCH

Cayuga Lake Trout Diary	Dwight A. Webster	JJ	58
Chenango Lake—Before and After		FM	57
Finger Lakes Rainbows—Spawning Habits	Richard W. Hatch	FM	57
Finger Lakes Rainbows, Part II—Tagging Studies and Future Management	Dr. U. B. Stone, W. L. Hartman	AM	57
Finger Lakes Rainbows, Part III—A Chronicle of Their Progress from Egg to Adult	Wilbur L. Hartman	JJ	57
Finger Lakes Rainbows, Part IV	Dwight A. Webster	AS	57
More About Striped Bass		AS	56
Oneida Lake Fisheries Research	Alfred W. Eipper	JJ	57
Selective Breeding of Trout	John R. Greeley, Gordon L. Trembley	DJ	57–58
The "Emmeline-M"		FM	57
The Emmeline-M (Editorial)		FM	57
The Fluke of Great South Bay	John C. Poole	JJ	58
The Lamprey in New York Waters	John R. Greeley	AS	56
The Weakfish—an Interstate Problem	John C. Poole	AS	56
Warty Walleyes	Roland Walker	ON	57
What's Down There?	C. W. Greene, A. P. Miller	DJ	56–57

FISH SALVAGE

Salvage Fish		FM	58

FLOODS AND FLOOD CONTROL

Program for Small Watersheds	Irving B. Stafford	AS	56
Wetlands vs Drainage		JJ	58

FLOWERS AND OTHER PLANTS

Herbs	David H. Thompson	DJ	57–58
Poison Ivy and Wildlife	Richard Headstrom	DJ	57–58
Showy Lady's Slippers	Nick Drahos	JJ	58
Sunflowers and Wildlife	Richard Headstrom	FM	58
Wild Teas and Tonics		DJ	57–58

FLOWER PLATES
(In Color)

Indian Pipe (Corpse Plant); Pinesap (False Beechdrops)	N. Y. S. Museum	JJ	57
Marsh Marigold; Cowslip	N. Y. S. Museum	AM	57
Sweet-Scented White Water Lily	N. Y. S. Museum	AS	56

FOREST FIRE CONTROL

Forest Fire Control in New York State	Averell Harriman	JJ 58
Fire Towns, Fire Districts	Solon Hyde	AS 56

FOREST MANAGEMENT

Plantation Thinning—at a Profit	E. W. Sears	JJ 58
Porcupines vs Trees	A. W. Roberts	DJ 57–58
Report on the Douglas Fir	R. Milton Hick	AM 58
Second Highest Sale	Roland B. Miller	AM 57

FOREST PEST CONTROL

DDT		JJ 57
Forest Pests in Review		ON 56
The Birchleaf Miner	Roy Irving	AS 56

FOREST PRESERVE

Forest Preserve Acquisition		AS 57
Forest Preserve Acquisition (Correction)		ON 57
The Milmoe Committee and the Forest Preserve		AM 57
The Northway	John W. Johnson	AM 57

FOREST PRODUCTS

Christmas Tree Bonus	Roy Irving	JJ 58
Cold Storage Trees		FM 58
Maple Sugar Time	Olga Lindberg	FM 58
Play Ball	Joseph J. Crowe	AS 56
The Sassafras Tree	Rosemary Clarke	AS 56
The Leon Wright Sugar Bush	Earl A. Westervelt	FM 58
Tree Farms Come to New York	Harold D. Ellis	AS 56

FORESTRY

Big Elm		AM 58
If the Woodchuck Can Do—So Can You	Dr. Earl L. Stone	AM 58
The "Money Tree"s	Harold D. Ellis	AM 57

FURBEARERS

More on Nutria		ON 57
The Future in Furs	Arthur H. Cook	ON 56
The Opossum in New York	W. J. Hamilton, Jr.	DJ 57–58

GAME

Anatomy of the Whitetail Deer	E. L. Cheatum	ON 57
Field Dressing a Deer	Nick Drahos	ON 57
Rabbit Season—the Long and Short of It	Joseph Dell	FM 58
The European Hare in New York	Joseph Dell	FM 57
The Squirrels of New York	W. J. Hamilton, Jr.	FM 57
Weathering the Winter	Dr. Edgar M. Reilly, Jr.	ON 57

GAME MANAGEMENT

A Bear by the Tail	Nick Drahos	ON 56
'Coons vs Cows		JJ 57
Deer of Either Sex Season (Dec. 1, 1956)		ON 56
Duck Banding at James Bay	Dick Ryan	DJ 56–57
Experiment at Rockland Light	Albert G. Hall, Robert G. Ohlman	FM 57
Grouse Food in the Making	Albert G. Hall	AM 57
Hungarian Partridge	John E. Wilson	AM 58
Live-Trapping White-tail Deer	A. W. Bromley, C. W. Severinghaus	ON 56
Man, Marshes—and Ducks	Arthur H. Cook	AM 57
Notes on Duck Bands	Don Schierbaum	AS 57
Rabbit Trouble	W. Robert Eadie	ON 57
Seneca Deer		JJ 58
Seneca Ordnance Deer—Part II	C. W. Severinghaus	FM 58
St. Lawrence Development	Ralph B. Colson	DJ 56–57
The Small Game Take	A. W. Bromley	JJ 57
Twin Falls Deer	A. B. Hatch	ON 57
Want More Rabbits: Here's How	Joseph Dell	DJ 57–58
Want More Rabbits? Part II	Joseph Dell	JJ 58

GAME PROPAGATION

Keeping Up With the Turkeys		DJ 57–58
Pheasants and the 4-H	Harlan B. Brumsted	JJ 57

GAME RESEARCH

Attention All Rabbit Hunters	Joseph Dell	ON 56
Deer in a Tuna Net		FM 58
How Much Food Does a Deer Need?		DJ 57–58
Mobile Field Units		JJ 58
The Bears and the Biologists		ON 57
Winter Kill of Deer, 1955-56	C. W. Severinghaus	AS 56

HISTORICAL

Adirondack Museum	Roland B. Miller	DJ 57–58
Apple Cider		FM 57
Dry Run! (Start of Watershed Surveys)		FM 58
Ducks Down the Drain	Philip Barske	ON 57
Forest Commission	Solon J. Hyde	AS 57
Here's One We Missed (Old Watermills)		DJ 57–58
Hold Your Horses		DJ 56–57
Little Grass Shack		FM 58
More on Trudeau	Roland B. Miller	AS 56
More on Trudeau	Roland B. Miller	FM 57
Old Watermills of New York	Nick Drahos	AS 57
Overlook Mountain	Alf Evers	FM 58
The Adirondack Museum	Roland B. Miller	DJ 56–57
Theodore Roosevelt—Conservationist		JJ 58
300 Million Years Ago	Donald W. Fisher	FM 58
Custodian's Camp, Morehouse Lake, 1896		AS 56
Fort Lee Redoubt	Roland B. Miller	AS 56
Iron Horses in the Adirondacks	Roland B. Miller	ON 56
Iron Horses in the Adirondacks, Part II—How They're Held in Check	Roland B. Miller	AM 57
Trudeau Sold	Roland B. Miller	AM 57
Wolves vs The State of New York		FM 57

HOBBIES

Around Long Island Underwater	Erwin J. Ernst	AS 57
Bait in Your Basement	Jean H. Glick	JJ 57
Living Underwater—Its Joys and Hazards	Phil Shapkin	AS 57
More on Carbon Tetrachloride	John A. Wilcox	FM 57
Raising Bait Fish and Crayfish		DJ 57–58

HUMOR

All About the One-Man Smog	Clayt Seagears	ON 56
And Now Mother		AM 58
Saber-Toothed Deer		AM 58
Side Hill Clinchers		AM 58
The Game Warden's Lament		AM 58
The Great White Stag of Whiteface Mt.	Clayt Seagears	AS 57
The Saga of Siam's Siamba	Clayt Seagears	DJ 57–58
To Move a Skunk—		FM 58
Who, Me?	Roland B. Miller	ON 57
Who Nose?		FM 58

HUNTING

A Wild Turkey Shoot?	Charles Mason	ON 56
Big Game Hunting Map (1957)		ON 57
Bonus Bears		FM 57
Duck Hunting—Calculated Insanity	A. W. Bromley	ON 57
Deer Take in New York—1957		AM 58
Duck Hunting Sketch Book	H. Wayne Trimm	ON 57
Got a Trophy?	Roland B. Miller	FM 58

Howland's Island Deer Hunt—1956		
Department's Report	A. S. Taormina	
Archer's Report	Wm. H. Wadsworth	FM 57
Hunting Accidents, 1955	A. W. Bromley	AS 56
Hunting Accidents, 1956		AM 57
Hunting Accidents, 1957	Bryan E. Burgin	AM 58
Hunting at Oak Orchard		DJ 57–58
How Much Does My Deer Weigh?		DJ 57–58
New York's 1956 Deer Season	C. W. Severinghaus	AM 57
Public Hunting—		
The Problem	Gustav A. Swanson	
The Program	E. L. Cheatum	FM 57
Small Game Hunting Prospects		AS 56
Small Game Hunting Prospects		AS 57
The Deer Season at Montezuma	Lawrence S. Smith	FM 57
The Small Game Take	Hubert Maguire, Shirley Parker	FM 58

INSECTS

All About Honeybees	Arthur W. Holweg	JJ 58
Ant Lions	Barnet Fowler	AS 57
Deer Ked		FM 58

INSECTS
(In Color)

Honey Bee	H. Wayne Trimm	JJ 58

INSIDE ON THE OUTDOORS
(By Clayt Seagears)

Chimp-Chest MacDougal Wins—		AM 58
Life Can Be Beautiful		JJ 57
Modern Nature Study—Life History of a Skunk		ON 56
Pair of Old Squaws in Winter Plumage		FM 58
Siam's Samba Almost Collapsed a Catskill		DJ 57–58
"Their Feet Went Pat-ta-Pat . . ."		AM 57
"The Fawn Jumped When It Saw the Sable"		ON 57
"The Fox Made Believe . . ."		DJ 56–57
"The Grouse Took Off in a Splatter of Alder Leaves"		FM 57
"How you perking?" the duck asked the snappy turkle		JJ 58
The White Stag of Whiteface Mountain		AS 57
This is the Picture		AS 56

LAKES

Bear Lake	U. B. Stone	FM 57
Brant Lake	Robert G. Zilliox	AS 56
Caroga Lake	William Shepherd	DJ 56–57
Cazenovia Lake	A. C. Petty	AM 57
Findley Lake	William G. Bentley	ON 57
Lake Askoti, Lake Skannatati	Cecil E. Heacox	JJ 58
Lake Glenida; Lake Gilead	John D. Gould	JJ 57
Loon Lake	Robert G. Zilliox	DJ 57–58
Mahopac Lake	Cecil E. Heacox	ON 56
Sacandaga Lake; Lake Pleasant	Robert G. Zilliox	AS 57

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Analyses of P-R-48-D	Oliver H. Hewitt	DJ 56–57
Battle of the Brush	A. S. Taormina, S. G. Ernst	DJ 57–58
The Hector Land Use Project	Dr. George C. Moore	FM 57
The Limestone Creek Watershed	Eleanor E. Hanlon	JJ 58
Waterfowl Marshes and Menus	Arthur H. Cook	FM 58
Wetlands, Water and Wildlife	Dirck Benson, Don Foley	AS 57
Wetlands, Water and Wildlife, Part II	Dirck Benson, Don Foley	ON 57
What's Ahead for P-R in New York	Earl A. Westervelt	DJ 56–57
Wildlife and the Conewango Watershed	Earl A. Westervelt	ON 57

LAWS

Changes in the License Year	W. Mason Lawrence	JJ 57
Duck Stamp Sales in New York and What It Means—		
In Waterfowl Preasure	Dirck Benson	
In Waterfowl Management	Don Foley	DJ 57–58
New Laws for 1958	Earl A. Westervelt	JJ 58
New Legislation—1957	Earl A. Westervelt	JJ 57
1956 Small Game Hunting Map		AS 56
1957 Small Game Hunting Map		AS 57

MAMMALS

Squirrel Emigration	Cecil E. Heacox, Albert G. Hall	FM 58
Stranded Mammals of the Sea	H. Wayne Trimm	AS 56
The Life Span of Animals		DJ 57–58
The Red Fox	Rosemary Clarke	AM 58

MAPS
(And Charts)

A New Day	Roy Irving	AM 57
Bear Lake	Roy Irving	FM 57
Big Game Hunting Map (1957)	H. Wayne Trimm	ON 57
Black Gold in New York	Roy Irving	AM 58
Boats and Boating on New York's Inland Waters	Roy Irving	AS 56
Brant Lake	Roy Irving	AM 58
Canada Geese	Roy Irving	DJ 56–57
Caroga Lake	Roy Irving	DJ 56–57
Cayuga Lake Trout Diary	Roy Irving	JJ 58
Cazenovia Lake	Roy Irving	AM 57
Chautauqua Lake Weed Control (Chautauqua Lake)		AM 57
Chenango Lake—Before and After	Roy Irving	FM 57
Conservation and World Population	Roy Irving	ON 56
Conservation Through Pollution Abatement	Roy Irving	JJ 57
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Duck Stamp Sales in New York and What It Means	Roy Irving	DJ 57–58
Erie County	Roy Irving	AM 57
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Field Trials (Areas Maps)	Roy Irving	AS 56
Findley Lake	Roy Irving	ON 57
Finger Lakes Rainbows—Part IV	Roy Irving	AS 57
Fire Towns, Fire Districts	Roy Irving	AS 56
Game Management Districts (Small Game Hunting Prospects)	Roy Irving	AS 56
Genesee County	Roy Irving	DJ 57–58
Lake Askoti, Lake Skannatati	Roy Irving	JJ 58
Lake Glenida; Lake Gilead	Roy Irving	JJ 57
Livingston County	Roy Irving	DJ 56–57
Loon Lake	Roy Irving	DJ 57–58
Mahopac Lake	Roy Irving	ON 56
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Monroe County	Roy Irving	ON 57
Montgomery, Schenectady Counties	Roy Irving	JJ 58
National Field Archery Tournament (Conn. Hill Game Mgt. Area)		AM 57
Niagara County	Roy Irving	JJ 57
1956 Small Game Hunting Map	Roy Irving	AS 56
1957 Small Game Hunting Map	Roy Irving	AS 57
Oneida Lake Fish and Game Club Project	Roy Irving	DJ 57–58
Ontario County	Roy Irving	AS 56
Orleans County	Roy Irving	AS 57
Pollution Field Survey	Roy Irving	DJ 57–58
Pollution Round-Up	Roy Irving	ON 56
Primary Waterfowl of New York	Roy Irving	ON 56
Sacandaga Lake; Lake Pleasant	Roy Irving	AS 57
St. Lawrence Development	Roy Irving	DJ 56–57
Salamanders and Lizards of New York (Range Maps)	H. Wayne Trimm	JJ 57
Small Game Hunting Prospects (Game District Map)	Roy Irving	AS 57
Tackapausha Nature Preserve		ON 56
The Conewango Watershed	Roy Irving	ON 57
The Limestone Creek Watershed	Roy Irving	JJ 58
The Northway	Roy Irving	AM 57
The Ring-Billed Gull	Roy Irving	DJ 57–58
300 Million Years Ago	Roy Irving	FM 58
Upland Game Birds of New York	Roy Irving	ON 56
What's Down There?	Roy Irving	DJ 56–57
Wyoming County	Roy Irving	FM 57
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Black Gold in New York ..... Earl A. Westervelt ..... AM 58

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Bedtime Story—Birds and Bees .. Clayt Seagears ..... AS 56
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Harbor Seal .... AM 57
Kapok Life Jackets .... AM 58
Lake George on the Air .... AS 57
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Lightning and Beech .... FM 57
The Muskrat, the Duck and the Snappy Turkle ..... Clayt Seagears ..... JJ 58
'Nessmuk Again ..... Nick Drahos ..... FM 57
Oak Orchard National Wildlife Refuge ..... A. W. Bromley ..... FM 58
Pigs and People (Editorial) .... JJ 58
Spare Me One Swamp ..... Liberty Hyde Bailey .... DJ 56–57
"Tame Deer" .... AM 58
The Brook ..... Tom Pease ..... AS 56
The Chipmunk's Cheek ..... Clayt Seagears ..... AM 57
The Front Cover ..... E. W. Littlefield ..... AM 57
The Trapper and the Ornament .. Clayt Seagears ..... DJ 56–57

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Donald R. Brockway .... AM 58
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Conservation Through Pollution Abatement ..... Thomas R. Glenn, Jr. ... JJ 57
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Pollution Abatement Progress .... FM 58
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"How you perking?" Duck asked Snappy Turkle